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It's time for a Science Adventure 3 Teacher's Edition, for Third Grade of Elementary Education, is a collective work designed and created under the direction of Claudia Eleonora Noriega Castillo, by the following team:

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## Let's start the feat...

With **It's time for a Science Adventure,** your students will be able to gain powerful English skills, while practicing and learning about science.

## All of the curricular content included

This six-level program for bilingual primary schools meets all of the curricular topics and achievement indicators with the support of scientific texts, images, diagrams, tables, and infographics.



## The student is the main character of this learning adventure

We start out by understanding science as a human activity, linked to the students' culture and their environment. We then seek to understand and explain natural phenomena, to experiment, and to make responsible decisions using language as a main resource, specifically English.

## This project includes:







All of the learning objectives, lessons, and assessments are structured making the learning process effective and measurable.



## **Richmond** Learning **Platform**

## **Digital support**

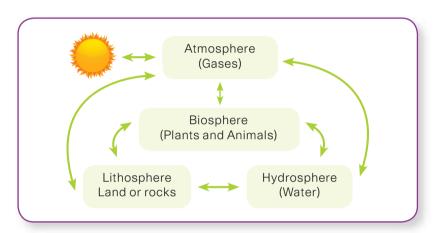
The Richmond Learning Platform provides digital reinforcement through interactive activities, exercises, quizzes, and audio.

# Let's start the adventure... exploring your student's book

**It's time for a Science Adventure** is the new approach that will help you to promote quality education in the 21st century.

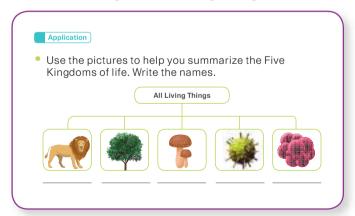
This work represents a milestone for practicing English skills, while learning science, health and environmental topics. **It's time for a Science Adventure** offers:

## Content in English that facilitates learning



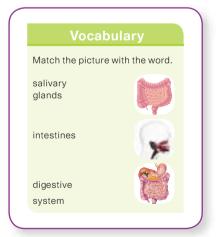
Students will comply with learning from the curriculum standards with the support of scientific texts, images, diagrams, tables, and infographics.

# Activities that scaffold the learning of the content and English language



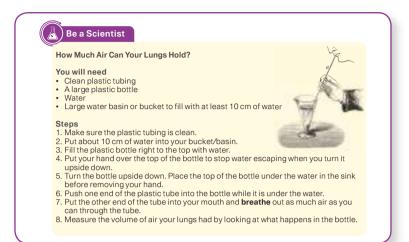
Students' reading comprehension will be reinforced. Writing will be easy, as they will start with short answers that will gradually be extended.

## **New Vocabulary**



Students will understand science concepts, and they will expand their English vocabulary.

## **Experiments to improve science**



Students will develop scientific skills through practice and carrying out experiments.

## 21st Century Skills

## **Critical thinking**



Students will use critical thinking to solve some activities. It gives them the opportunity to talk and discuss their ideas.

## Creativity



Activities to jump-start your students' creativity and inspire their imagination.

# Podcast of the lesson to practice listening and pronunciation





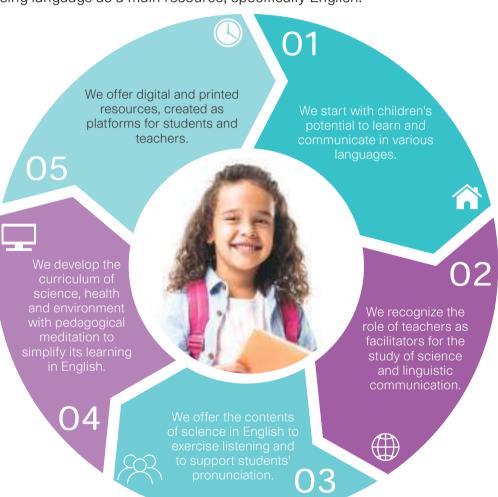
Educational recordings that will allow your students to study the content in English, anywhere they are. This will also reinforce their listening comprehension and English pronunciation.



# SCIENCE for Teachers

**It's time for a Science Adventure** is an integrated project that simultaneously responds to two of the challenges of 21st century skills in education: teaching science to English learners.

For this purpose, we start out by understanding science and health as a human activity, linked to students' culture and their environment. This helps to understand and explain natural phenomena, to experiment and to make responsible decisions using language as a main resource, specifically English.



## Illustrated vocabulary of new words

To support bilingualism, the CLIL methodology (Content and Language Integrated Learning), also known in Spanish by the acronym AICLE (Aprendizaje integrado de contenidos y lenguas extranjeras), is emerging.

CLIL proposes to teach curricular subjects using a foreign language as a vehicle, fulfilling a double goal: the learning of the subject and of the second language.

## The language will be addressed in three dimensions:

Language

Of learning

For learning

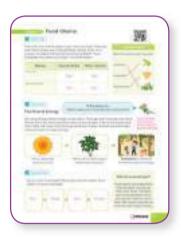
Through learning

Vocabulary and phrases related to the content and to grammar rules.

Terms required for learning: following directions, searching for information, etc.

The language is used to support the processes of thinking and understanding of the world.

## **Resources for teachers**



Student's book with answers



Lesson's teaching tips



## **Richmond** Learning **Platform**

Exclusive for Richmond Solution

- Digital book
- Interactive activities
- Worksheets
- Audios
- Assessments







The contents are organized into 40 lessons discussing these topics:



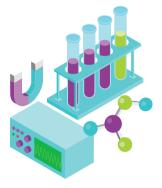
Living Things and Their Environment



The Human Being and Health



Earth and the Universe



Matter, Energy, and Technology

## Each lesson includes the learning methodologies:

Warm-up

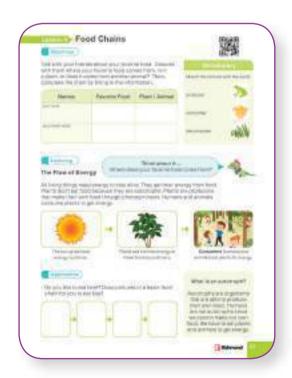
 Short and dynamic activities to start the class. They promote interest among students.

Learning

 Content explained in a clear and simple way, supported by graphic organizers, infographics, images, etc.

Application

Activities that practice different skills: memorization, comprehension, application, and analysis.



## **Scope and Sequence**

Learning goals	Content	Pages	Class-Time
Recognize that the	Lesson 1. Components of the Environme	nt	
community and everything in it, is part of	Elements of an environment	9	1
the environment.  • Identify diversity as one	Ecosystems, biotic and abiotic factors their environment	10, 11	1
of the characteristics of their environment.	A balanced environment	12	1
	Application	9, 10,	11, and 12
Develop a structured	Lesson 2. Kingdoms of Living Beings		
concept of environment, grouping its elements.	The five kingdoms (animal, monera, fungi, plant, protist)	14 to 16	3
	Application	14, 1	5, and 16
Identify diversity as one     of the above togistics of	Lesson 3. Relationships between Living 7	hings	
of the characteristics of our environment.	Plants and animals in their environment	17	1
	Interaction with the non-living environment	19	1
	Microorganisms	20	1
	Application	17, 18	19, and 20
Classify plants	Lesson 4. Plants and Their Classification		
according to their type of reproduction and structure.	Structure and functions of different parts	21	1
	Flowering and non-flowering plants	22	1
	Vascular and non-vascular plants	23	1
	Classification based on growth habits	24	1
	Application	21, 22,	23, and 24
Recognize the functions     of the rest, stem, and	Lesson 5. Photosynthesis and Plant Repr	oduction	
of the root, stem, and leaves of the plant,	Photosyntesis and its phases	25, 26	1
including respiration, food production, and storage.	Reproduction of flowering and non-flowering plants	27, 28	2
	Application	26, 2	.7, and 28

Learning goals	Content Pages		Class-Time	
	<b>Experiment</b> 161 to 1		164	1
Classify animals	Lesson 6. Animal Diversity			
according to vertebrates and invertebrates,	Vertebrate or invertebrate	29		1
and relate them to their habitat, and	Types of invertebrates by habitat	31, 32		2
characteristics of each.	Application	30, 3	31, and	d 32
Assessment 1				
Systemize the concept of diversity	<b>Lesson 7.</b> Natural or Artificial Origin of the Environment	e Elements	of th	e
by classification of the elements from which it	Natural and artificial environments	33		
derives and emphasize the importance of balance between the	Natural and human-made elements in the environment	34, 35		2
different elements of an environment.	Reduce, reuse, and recycle	36		1
	Application	33, 34	, 35, a	nd 36
Recognize that in an	Lesson 8. Biodiversity			
environment, all living things depend on	What is biodiversity	37		1
each other and other elements.	Adaptations and endangered animals	39		1
	Measuring biodiversity	40		1
	Application	37, 38	, 39, a	nd 40
Understand how plants,     animals, funding and	Lesson 9. Food Chains			
animals, fungi, and microbes interact in the	The flow of energy	41		2
food chain.	Food chains, decomposers	42, 43		۷
	Food pyramids and food webs	44		1
	Application	41, 4	3, and	d 44
Recognize that balance in	Lesson 10. Cycles of Nature			
nature occurs around the relationships that living	The beginning and the end of life	45		1
beings maintain within the food chain and in the	Chemical nutrients	46		1
exchange of gases.	Fantastic fungi and composting	47, 48		1

Learning goals	Content	Pages	Class-Time	
	Application	45, 46, and 47		
Recognize that all     It is not things depend.	Lesson 11. Alterations of Ecosystems			
living things depend on each other and on	Balance and drivers in ecosystems	49, 50	2	
other elements in the environment.	Human activities that change an ecosystem	52	1	
	Application	50, 5	i1, and 52	
Recognize the	Lesson 12. The Locomotor System			
importance of movement in human beings through	Function and parts	53, 54	2	
the different actions where it intervenes.	Care of the bones and the muscles	55, 56	2	
	Application	53, 54	, 55, and 56	
Describe the structure	Lesson 13. The Respiratory System			
and function of the respiratory system.	Function and parts	57	1	
	Voluntary and involuntary breathing	58, 59	2	
	Care of the respiratory system	60	1	
	Application	58, 5	59, and 60	
Describe the structure     and function of the	Lesson 14. The Circulatory System			
and function of the circulatory system.	Function and parts	61 to 63	3	
	Elements of blood	64	1	
	Application	62, 6	3, and 64	
Describe and explain the	Lesson 15. The Digestive System			
structure and function of the digestive system.	The digestive system and its care	65 to 67	2	
	Other important organs	68	1	
	Application	65, 67, and 68		
Describe the structure of	Lesson 16. The Excretory System			
the excretory system and its operation.	Function and parts	69	1	
	The blood vessels and other organs	71, 72	2	
	Application	69, 70	, 71, and 72	

Learning goals	Content	Pages	Class-Time
Describe the	Lesson 17. The Reproductive System		
reproductive organs of men and women	The reproductive system: female and male	73 to 75	3
and practice hygiene measures of the genital	Care and hygiene	76	1
organs.	Application	73, 74	, 75, and 76
Know the structure and	Lesson 18. The Senses		
function of the sense organs.	The five senses (touch, smell, sight, hearing, and taste)	77 to 79	2
	Care and hygiene	80	1
	Application	77, 78	, 79, and 80
Assessment 2			
Recognize the basic      Recognize the basic      Recognize the basic      Recognize the basic      Recognize the basic	Lesson 19. Needs of the Human Being		
needs of human beings from the individual,	Maslow's hierarchy of needs	81	1
social, and cultural point of view, promoting behavior that satisfy them.	Safety and security needs, love and belonging needs, relationship needs with other living beings	83	1
	Application	81, 82	, 83, and 84
Identify and classify the	<b>Lesson 20.</b> Disease Transmissions and P	reventive N	Measures
most frequent diseases in the community	Diseases	85	1
according to their causes and transmission,	Contagion and preventive measures	87, 88	2
and state preventive measures.	Application	85, 86	, 87, and 88
Identify risky conditions	Lesson 21. Accidents, First Aid, and Disas	ster Prever	ntion
to avoid situations that could trigger an	Who to call in an emergency	89	1
accident, and visualize the consequences of the	Most common accidents and prevention	90 to 92	1
most common accidents and emphasize the need	The risk of using fireworks	92	1
for prevention.	Application	89, 90	, 91, and 92
	Lesson 22. The Nutritional Value of Food		
	Balanced diet and the processing of food	93, 94	1

Learning goals	Content	Pages	Class-Time	
Identify and relate     nutritional food     consumed in the     community, and	Nutrition and pregnancy	95	1	
classify them according to nutrients, origin,	Problems with nutrition	96	1	
<ul> <li>preparation, and function in their bodies.</li> <li>Understand the positive effect of good nutrition on the mother during pregnancy and lactation of the baby.</li> </ul>	Application	93, 94	, 95 and 96	
Understand, identify	Lesson 23. Food Preservation and Hygier	ne		
explain, and practice all the hygienic measures	Methods of preservation	97, 98	2	
necessary for the handling, preparation,	Preventing food poisoning	99	1	
consumption, and preservation of food.	Application	97, 98, 99, and 100		
	Experiment	165 to 168	1	
Identify and explain the	Lesson 24. Malnutrition and Poor Nutrition			
forms of malnutrition in the area, and their origin,	Proper nutrition	101	1	
and differentiate between malnutrition and poor	Malnutrition and its conditions	102	1	
nutrition.	Application	101, 1	02, and 103	
Know the functions that     water place in our bady.	Lesson 25. Water and Organisms			
water plays in our body and describe the most	Water and human body	105	1	
important processes in which it participates	Preventing dehydration	106	1	
and learn to prevent dehydration through	Water's function and process in the body	107, 108	2	
proper food management and hygiene.	Application	105, 106	, 107, and 108	
Know the ways in which     water shapes a state	Lesson 26. Water			
water changes state.	States of water and its use	109, 110	2	
	The conservation of water on Earth	112	1	

Learning goals	Content	Pages	Class-Time
Identify main sources of water and understand the water cycle, as well as the correct management of water.	Application	109, 110	, 111, and 112
Identify and locate rivers     and basins of the area	Lesson 27. The River Ecosystem		
and understand the	Different freshwater resources	113	1
relationship between the two.	Plant and animal life in rivers	115	1
Describe the	People and river ecosystems	116	1
characteristics of the fluvial ecosystem formed by a river and its banks, and describe ways of using river water and the correct management of it.	Application	113, 114	, 115, and 116
Identify and locate the	Lesson 28. Ocean Ecosystems		
ecosystems that exist in Honduras. Describe	Types of marine biomes	117	1
the main characteristics of marine and coastal	Ocean plant and animal life	118	4
ecosystems and identify the sources of sea	The ocean and our weather	119	1
pollution, and understand the role of the seas as	The use of ocean resources	120	1
regulator of our climate.	Application	118, 119, and 120	
Explain what soil is and	Lesson 29. Soil		
how it is formed.	Soil formation and different types	121, 122	1
Differentiate different types of soil.	Application		121
Describe concrete	Lesson 30. Erosion and Soil Conservatio	n	
examples of rotation and combination of crops.	Agents and effects of soil erosion	123, 124	1
Recognize appropriate     and inappropriate     techniques for soil     conservation.	Application	123	and 124
Identify the sources	Lesson 31. The Atmosphere		
of pollution in the atmosphere.	The atmosphere: function, air pollution and how to reduce it	125, 126	2

Learning goals	Content	Pages	Class-Time	
	Application 125 and 12		and 126	
Assessment 3				
Represent and describe the structure and	Lesson 32. The Universe and the Solar System			
dynamics of the Solar System and describe	The Solar System and stars that make up the universe	127, 129	3	
some principles of celestial mechanics.	Application	127, 128	, 129, and 130	
Describe some principles	Lesson 33. The Moon and the Eclipses			
of celestial mechanics.	The lunar and solar eclipses	131, 132	1	
	Application	131	and 132	
	Experiment	169 to 172	1	
Describe the movements	Lesson 34. Earth's Movements and Seasons			
of the Earth.	Day and night; the different seasons and their causes; tropical, dry, and wet zones	133 , 134, 136	3	
	Application	133, 134	, 135, and 136	
Acquire basic concepts	Lesson 35. Matter			
necessary to define matter.	Stages of water	137	1	
	Matter: changes in the state and properties	138	2	
	State of matter: solid, liquid, gas plasma and Bose- Einstein condensate	139, 140	2	
	Application	138, 1	39, and 140	
Recognize different	Lesson 36. Energy			
energy sources and their application.	Different forms and sources of energy (renewable and non-renewable)	141, 142	1	
	What is electricity and safety tips	143, 144	1	
	Application	141, 142	, 143, and 144	

Learning goals	Content	Pages	Class-Time
Identify, define, and	Lesson 37. Machines		
describe levers, wheels, inclined planes, and pulleys.	What are machines Lever wheel and axle, inclined plane, wedge, pulley, screw Compound machines	145 to 148	3
	Application	146, 14	47, and 148
Value local crops as part	Lesson 38. Local Crops		
of their life and the main source of food in their	Agriculture in Honduras	149	1
life, and promote the practice of the variety of local and non-local crops	Difficulties in farming, improvement of production and technology in crops	150, 151	2
in orchids and plots.	Application	149, 150	, 151 and 152
Practice the basic	Lesson 39. Solid Waste Management	'	
rules of personal and environmental hygiene,	Organic and inorganic waste	153	0
transmitting its principles to other members of the	Waste management and recycling	154, 155	2
<ul><li>community.</li><li>Conceptually relate the</li></ul>	Relationship of soil waste management with the environment	156	1
state of the environment and the incidence of diseases and accidents	Application	153, 154,	155, and 156
in their daily life.	Experiment	173 to 176	1
Practice environmental	Lesson 40. Recycling and Technology	,	
education, transmitting its principles to other	What is recycling	157	
members of the community.	Paper recycling and biomaterials	158, 159	2
	Application	157, 1	59, and 160
Assessment 4		1	

## Lesson 1



#### Learning goals

- Recognize that the community and everything in it, is part of the environment.
- Identify diversity as one of the characteristics of their environment.

#### Standard

• Recognize the characteristics of living and non-living things and the benefits of their relationship with each other.

#### Content

- Elements of an environment
- Ecosystems
- Biotic and abiotic factors
- Atmospheric elements
- Living things and their environment
- A balanced environment



#### Key Language

**turbulence.** The forceful or unstable movement of air or water.

**lithosphere.** The outer part of the Earth that contains the crust and upper mantle.

**hydrosphere.** All the water on and above the Earth's surface, like lakes, oceans, and clouds.



## **Science and Technology**

 Ask students to watch the video about abiotic and biotic factors.



 Students take a walk around the schoolyard and find ten different biotic and abjotic elements.



## **Complementary Activities**

#### Warm-up

• When introducing the topic, ask students to have a discussion about their environment and the different elements that make up their environment.

#### **Learning and Application**

- Students draw a picture showing all the living and non-living things that can be found in a terrestrial ecosystem of their choice.
- Each student gets a turn to name an animal. The class then discusses how that animal has adapted to live in its environment.
- Advanced students can research the importance of balance in an ecosystem. They
  then explain what the impact would be if a part of the forest is cleared in order for
  a new department store to be built.
- At the end of the lesson, ask: What does your environment consist of? Do all living things have an environment? What ecosystems exist? What ecosystem do you live in? What biotic and abiotic factors do you depend on? What are some functions of a cow? What are some functions of trees? What is a balanced environment?



## Lesson 2



#### Learning goals

Develop a structured concept of environment, grouping its elements.

#### Standard

• Recognize the characteristics of living and non-living things and the benefits of their relationship with each other.

#### Content

- The animal kingdom
- The monera kingdom
- The fungi kingdom

- The plant kingdom
- The protist kingdom



#### **Key Language**

**microscope.** A device to help you see organisms or objects too small to be seen with the naked eye.

**multicellular.** An intricate organism made up of numerous cells.

**unicellular.** A simple organism made up of one cell.



## Science and Technology

 Ask students to watch the video about the five kingdoms.



 Students have to identify each kingdom and name one characteristic for the kingdom.



## **Complementary Activities**

#### Warm-up

• When introducing the topic, ask students to talk about living things and different ways in which they can be categorized.

#### **Learning and Application**

- Students use magazines to find pictures of organisms that can be found for each kingdom of life and group them in a pyramid style from largest to smallest.
- Students identify ten different types of fungi and then categorize them as safe or dangerous for human consumption.
- Advanced students can create a comic strip about the five kingdoms and their interaction with each other.
- At the end of the lesson, ask: How many kingdoms of living beings are there? Can you name them? Why are living things classified into kingdoms? Which kingdom are you a part of? Why aren't fungi plants? Which kingdom is the largest?

## **Lesson 1** Components of the Environment

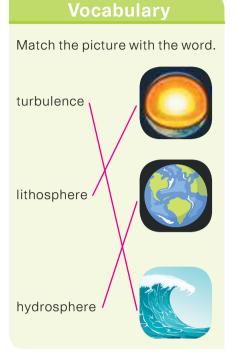


Warm-up

The environment is everything that surrounds us. All elements including the air, soil, water, plants, and animals make up the environment.

Take a walk around your school and identify the following elements that make up your daily environment. Check what you saw on your walk.







Learning

#### **Elements of an Environment**

An environment is a combination of both natural and human-made elements. These elements are divided into two types: biotic and abiotic. Biotic elements are all the living organisms. Abiotic elements include all the non-living things. How can we identify the biotic and abiotic elements? Well, all living organisms have basic needs, just like humans!



## **Critical Thinking**

How is your environment different compared to an animal living in a forest?

O.A. Examples: I sleep in a bed. I live in a house, etc.

## **Application**

 Use the words from the word box and write them under. the factor that determines an organism's environment.





Sunlight



Air



Food



Water



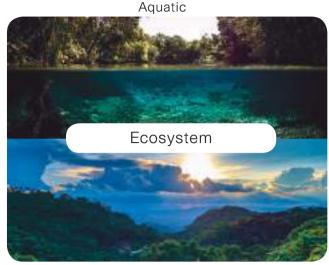
Place to



Ideal temperature

#### **Ecosystems**

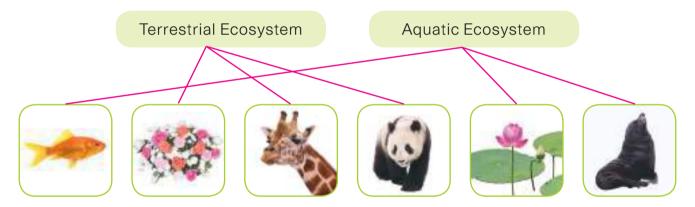
All living organisms need a healthy environment to survive. An ecosystem is an area where living organisms interact in a specific way with the local environment to survive. When ecosystems are damaged, some living organisms may not be able to survive. Ecosystems can be either terrestrial or aquatic. Living organisms are adapted to survive according to their environment.



Terrestrial

## **Application**

Connect the animals with the correct ecosystem they live in.



#### **Biotic and Abiotic Factors**

Consider a small puddle of water in a forest. In it, you may find all sorts of living things, from microorganisms to insects to plants. These living things may depend on non-living things like water, sunlight, **turbulence** in the puddle, temperature, atmospheric pressure, and nutrients in the water for life. Abiotic resources are usually found from the **lithosphere**, **atmosphere**, and hydrosphere. Examples of abiotic factors are water, air, soil, sunlight, rocks and minerals.

## Application

• Circle three abiotic factors in this ecosystem.



## **Atmospheric Elements**

The atmosphere contains the air that plants and animals breathe to survive. The atmosphere is made up of mostly nitrogen (78%) and oxygen (21%). There are lots of other gases that are part of the atmosphere, but in much smaller amounts. Oxygen is needed by animals to breathe. Carbon dioxide is used by plants for photosynthesis.

## **Application**

 Both plants and animals are living things that need air, but they use it differently.
 Use the pictures to explain the difference.



Animals breathe in oxygen from the air.



Plants need carbon dioxide for photosynthesis.

## **Living Things and Their Environment**

Animals and plants have specific functions and features that help them to survive in their environment. Plants and animals are adapted to survive in their environment. As you have learned, all animals have basic needs. Their adaptations help them to satisfy their needs such as breathing, eating and protecting them against predators and harsh conditions.

## **Application**

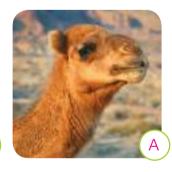
 Match the correct adaptation with the correct terrestrial or aquatic living organism by writing the correct letter in the box.



**A)** Two sets of eyelashes to protect eyes from sandstorms in the desert environment.



**B)** Adapted to eat insects when growing in areas with low nutrients in the soil.



**C)** Adapted with gills to breathe under water.



**D)** Flexible stems to move with water current.

#### **A Balanced Environment**

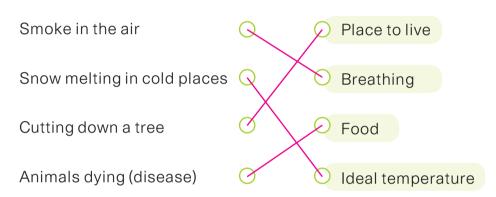
Both biotic and abiotic elements should be in balance for an environment to be able to maintain and sustain all the living organisms. Disturbances in the balance may cause problems and ecosystems will be affected.



#### **Application**

Match the basic need that may be affected due to the following:

#### **Disturbance**





# Did you know? If organisms cannot adapt to changes in their ecosystem,

in their ecosystem, they may move to a different location, or face becoming extinct.



In this project you will make a 3D presentation of living and non-living organisms in an environment.

#### You will need

Paper, markers, glue, objects to represent biotic and abiotic factors in an environment.

#### Instructions

- 1. Work in groups of 4 or 5.
- 2. Walk through your classroom. Find examples of biotic and abiotic elements.
- 3. Prepare your presentation and glue the objects in the correct column.
- 4. Be creative! Think about the atmospheric elements. What can you use to represent clouds? Are clouds biotic or abiotic?



Living



Non-living

## **Lesson 2** Kingdoms of Living Beings



#### Warm-up

Sorting is a process where we arrange items systematically. It can be done in many different ways. One of the ways we can sort items is to categorize. Categorizing means grouping items with similar properties.

Color all the pictures of living things.





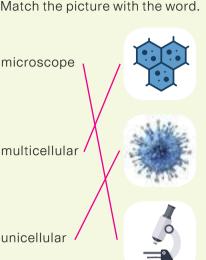






## Vocabulary

Match the picture with the word.



## Learning

The Five Kingdoms is a system that scientists have developed in order to classify living things. The Five Kingdoms are based on what the living things in a group have in common, and the differences between them. The system of the Five Kingdoms is over 2,000 years old, but it is always changing because of new information and ideas that scientists have.

Everything that lives on Earth belongs to one of the five kingdoms.



Each kingdom has its own features. All the organisms in a kingdom are similar in some ways.





## **Critical Thinking**

Why do scientists use a microscope?

To observe microorganisms that we cannot see with our eyes.

Scientists can tell how to classify a microorganism into a kingdom by studying it under a microscope.



## **The Animal Kingdom**

Organisms in the animal kingdom are **multicellular**. They rely on other organisms for food. This kingdom is by far the largest of all the kingdoms. The animals of this kingdom can be found all over the world. They can be any size, from very tiny to extremely big. Humans are members of a large group of animals known as mammals.

Let's learn about the different kingdoms of life.





## The Monera Kingdom

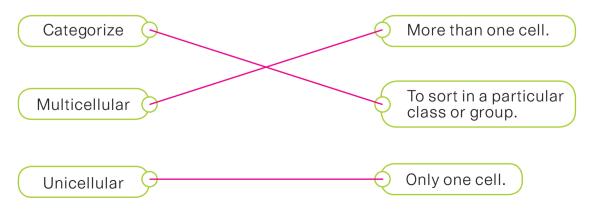
The monera kingdom has organisms that are **unicellular**. Unicellular means that an organism has only one cell. An interesting fact about the monera kingdom is that the unicellular organism is very simple, and does not have many of the parts that other multicellular organisms have. In unicellular organisms, the cell nucleus acts like the brain of the cell; it helps control functions, such as eating and moving. Bacteria is an example of a monera organism.



Bacteria

## **Application**

Match each word below with its correct description.



## The Fungi Kingdom

Fungi have their own kingdom because there is no other organism like them. A while ago, people thought they were plants, but they differ from plants in one major way - fungi cannot make their own food. Mushrooms are a type of fungi.

## Application

• Look at the pictures of a plant and a fungus. Do you notice any differences?





List your differences:

- Fungi have no leaves.
- Fungi have a soft stem.
- Fungi can grow on plants.

**The Plant Kingdom** 

The plant kingdom includes any organism that is able to use water and sunlight in order to make its own food. The plant kingdom includes trees, flowers, algae, grass and any other forms of plants that survive by making its own food. Plants, like animals, come in all different shapes, sizes, and features. They are found all over the world.



## Application

Write T for true and F for false.

Humans have their own kingdom of life.



Bacteria falls under the Fungi Kingdom.



Mushrooms can't produce their own food.



The plant kingdom can only be found in some areas around the world.



## **The Protist Kingdom**

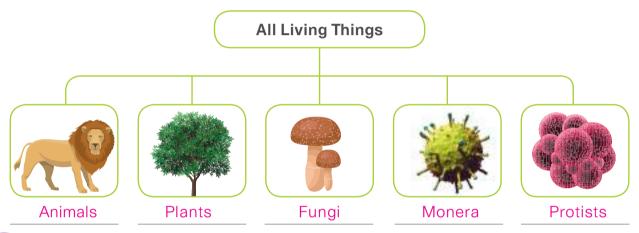
Protists are similar to monera in that they are unicellular. Protists are a bit more complex because they contain a nucleus. They also have moving parts. Protists can move around within their environment. One example of a protist is an amoeba.



Amoeba

## **Application**

• Use the pictures to help you summarize the Five Kingdoms of life. Write the names.





## Game Time!

#### You will need

Colored paper, black paper to make the train wheels, items and toys found in your classroom. (This should include school supplies, stationary, plastic toys of animals, arts and crafts supplies, etc.)

#### Instructions

- 1. Create a color sorting train with colored paper sheets.
- 2. Find objects in your classroom. Categorize them according to their color.
- 3. In groups, study each color and see if you can categorize the items even further. For example, toys and school supplies, big and small, living and non-living.
- 4. You can keep going until you can't think of any more ways to categorize your items.
- 5. Write down your categories and share them with the class.



Category 1	Color
Category 2	Ex: Toys/ Supplies
Category 3	Ex: Big/ Small
Category 4	Ex: Living/ Non-living
Category 5	Ex: Old/ New

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## Lesson 3



#### Learning goals

Identify diversity as one of the characteristics of our environment.

#### **Standard**

 Classify natural resources, identifying conservation strategies to avoid alteration in ecosystems.

#### Content

- Plants and animals in their environment
- Relationships between living things
- Interaction with the non-living environment
- Microorganisms



#### Key Language

**communicate.** The process of sharing information by speaking, writing, or using signals.

**signals.** An action or sound to give commands or information.

**microorganism.** A miniscule organism like a fungus, bacterium, or virus.



## Science and Technology

 Ask students to watch the video about animal communication.



 Students discuss how their communication and that of their favorite animal, differ.



## **Complementary Activities**

#### Warm-up

• When introducing the topic, ask students to discuss emotions and how they express their emotions in different situations.

#### **Learning and Application**

- Students choose a relationship between two living beings, draw a picture and write a few sentences to explain the type of relationship.
- Students discuss the importance of living and non-living things having balanced interactions with each other and what the outcome would be if the balance were to be disturbed.
- Advanced students can research microorganisms and identify different microorganisms that are useful and/or harmful to humans by writing a sentence about each one.
- At the end of the lesson, ask: Do all living things communicate? Can you name an example of animal communication? Can you name an example of plant communication? Have you ever encountered mutualism, commensalism, parasitism, predation, or competition? If so, how?



## Lesson 4



#### Learning goals

Classify plants according to their type of reproduction and structure.

#### **Standard**

Describe the characteristics and mechanisms of plant reproduction.

#### Content

- Structure and functions of different parts
- Flowering and non-flowering plants
- Vascular and non-vascular plants
- Seedless plants
- Classification based on growth habits



#### Key Language

**photosynthesis.** The process where green plants use sunlight to create food.

**petals.** The leaf-like segments of a flower that are usually colored.

**fertilize.** To provide with fertilizers or add nutrients to.



### Science and Technology

 Ask students to watch the video about the difference between flowering and non-flowering plants.



 Students make a Venn diagram to show the similarities and differences between flowering and non-flowering plants.



## **Complementary Activities**

#### Warm-up

• When introducing the topic, ask students to discuss different plants and their plant parts.

#### **Learning and Application**

- Students start a classroom garden by planting different seeds and ensure the plants' needs are met in order for them to grow.
- Students discuss how different plants are used in their homes by examining the purposes of various plants.
- Advanced students can choose a plant and research how that plant's changes and growth is related to its environment, climate, seasons, etc.
- At the end of the lesson, ask: Can you name the parts of a plant? What are the functions of the plant parts? Can you name some non-flowering plants? What is your favorite flowering plant? What is the difference between vascular and non-vascular plants? Where can you find seedless plants?



## **Lesson 3** Relationships between Living Things



Warm-up

Humans have the ability to express their feelings using their face, hands and bodies. Think about it. What does your face look like when you are feeling excited? How about your body language? Are you jumping up and down?

Let's see if your partner can guess how you are feeling. Choose an emotion below and see how many your friend can guess correctly. You can make up your own emotions and feelings, too!











## Vocabulary Match the picture with the word. communicate signals microorganism 4

Learning

#### Plants and Animals in Their Environment

Plants and animals **communicate** in a different way than humans. Animals communicate by sending and receiving signals. Communication is usually between the same species, but it can also happen between two animals of different species. Communication behaviors can help animals find mates, show power, protect their habitat, coordinate group behavior, and care for their young.



## **Critical Thinking**

How do plants and animals communicate? What do they do when they feel in danger?

Animals communicate through signals and by finding shelter. Plants use chemicals to communicate.

Let's learn more about how animals and plants communicate.



**Application** 

• Write the names of the animals that communicate in special ways.

Communication	Picture	Animal
These animals glow to attract mates.		Fireflies
These animals kick each other to show power (dominance).		Horses
These animals give off a terrible smell to chase away predators.		Skunks

Plants can't run away, so they have to develop other strategies to stay alive. Plants communicate through the air and their roots. They make chemicals to communicate with insects and each other. As odd as it sounds, plants can even defend their habitat by pushing or killing other competitors out of the way!



Plants use chemicals to attract insects

#### Application

• Circle the insects you think can harm plants.







## **Relationships Between Living Things**

Everything on Earth doesn't exist in its own little bubble. Species interact every day. This interaction is a vital part of how organisms develop and change over time. When you study species, it is important to watch the way they interact with their surroundings. Have you ever heard of a flea and dog relationship? Look at the picture. Do you think this relationship is good for both organisms?



No, because the flea harms the dog.

The relationship between a dog and a flea is called parasitism. This relationship is between two living things, where one of the organisms benefits from the other, which in turn is harmed.



Mutualism is the association where the two living things get something from the other. The relationship may give one or both food, shelter, or any other mutual need.



Commensalism is a relationship where living things benefit from living with one another without harming each other, like a tree frog using plants as protection.



Predation is an interaction between species in which one uses another species as food. Predators, like lions, hunt other animals, like a buffalo, to prey on.



Competition is an interaction between species that need the same resource.
For example, woodpeckers and squirrels compete for the same living space.

#### **Application**

Mark an X to show the correct relationship.

Animals	Parasitism	Commensalism	Mutualism	Predation	Competition
Cat and a mouse				*	
Mosquito and human	*				
Woodpecker and zebra			*		
Hyena and lion					*
Owl and tree		*			

## Learning

## Interaction with the Non-living Environment

The interactions between living things and their non-living environment makes up a total ecosystem. In an ecosystem, living organisms compete for water, food and space. To satisfy their basic need for food, plants and animals interact in different ways. This ensures that all organisms can survive in a specific area. If not, some animals are adapt or forced to move to other locations.

## **Application**

 How are plants, animals and the non-living environment connected? Look at the picture and explain the connection. What would happen if there were no more trees?



Plants need the sun. Elephants need plants and water. Lions need elephants.

If all of the trees disappeared, elephants would die. Then lions might run out of food, too.

### **Microorganisms**

Take a look at your fingertips. Do you think they're clean? Well, millions of living things are on the tip of your finger. There are even more on your hands. These little things are called **microorganisms**. Microorganisms are very, very small living things. They live all over you and on everything around you.



The little creatures on your fingers are microorganisms called bacteria. Bacteria live almost everywhere, including in our stomachs, dirt, and

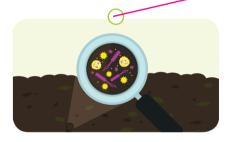
in our favorite meal. A lot of them are actually good for humans!

## **Application**

Match the helpful bacteria to the correct picture.

Good bacteria in our stomachs help us to digest the food we eat.

Bacteria found in soil, help break down dead leaves and other things. Probiotics are live bacteria that keep animals healthy.







## Be a Scientist

#### You will need

Stove, milk, pot, glass container, active culture yogurt, large container, cooler bag, hot water

## **Steps**

- 1. Have your teacher heat some milk on the stove.
- 2. Just before it begins to boil, it will start to foam a little on top. Have your teacher pour your milk into a clean glass container.
- 3. When the milk has cooled enough that you can just touch it, add about one teaspoon of live active culture yogurt.
- 4. Seal your container and place it in the cooler bag alongside a large container with very hot water. This will keep your yogurt warm while it cures.
- 5. Leave it to cure for about 5-12 hours, depending on how sour you want it.
- 6. Add sugar, fruit, or frozen berries to suit your taste.

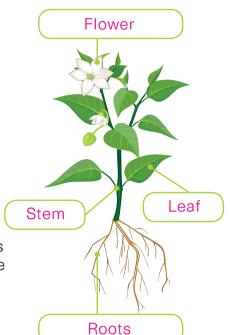
## Lesson 4 Plants and Their Classification

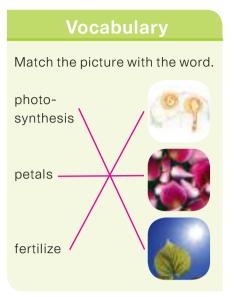


## Warm-up

A plant is made up of many different parts. The three main parts are: the roots, the leaves and the stem. Some plants have flowers, too! Each part has a set of jobs to do to keep the plant healthy.

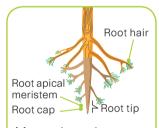
Identify the four basic parts of a plant. Write them in the correct box.



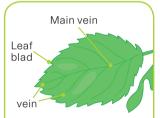


## Learning

#### Structure and Functions of Different Parts



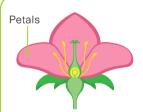
Many plants have a main root that divides to anchor the plant to the ground. It keeps the plant steady and upright.



A plant's leaves collect energy from the sun and make food for the plant using a process called photosynthesis.



The stem transports water through the plant. It also helps raise the plant's flowers and leaves to bring them closer to the Sun.



Most plants have flowers. Once the flower has opened, its brightly colored petals attract insects that pollinate the flower.

## **Application**

• In your own words, write down the main function of each part of the plant.

Supports the plant. Roots

Make food and energy for the plant. Leaves

Carries water to the plant and brings leaves closer to the sun. Stem

Attract insects. Flowers

## Flowering and Non-flowering Plants

When a flowering plant reaches the adult stage, the plant produces flowers. They can develop into fruits and seeds after being pollinated and **fertilized**. The flower contains the plant's reproductive organs. They generate seeds to give life to new plants.

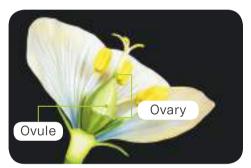


The male organs of the flower, the stamens, produce pollen, which is made up of tiny little grains of powder, usually yellow.



How do plants without flowers reproduce?

They grow from rhizomes or tubers. Plants can also reproduce from cuttings or shoots.



The pistil, the female reproductive part, typically sticks out beyond the stamen so that insects can easily brush up against it. This helps transfer pollen and fertilize the seeds in the ovaries.

Non-flowering plants do not carry flowers. They produce spores, fungi or cones that are used for reproduction. Algae, moss, ferns and conifers are examples of non-flowering plants.





Moss





**Application** 

 Take a walk around your school. Draw a picture of a flowering and nonflowering plant you can find. O.A.

Flowering

Non-Flowering

#### Did you know?

Some plants are like the human body with veins to transport water.



#### Vascular and Non-vascular

There are many different types of plants. They are typically divided into two major groups: vascular and non-vascular.



# Vascular plants have specific tissues that help to move materials.

Vascular

such as water. through the plant. Most plants are vascular. All flowering plants are vascular.



#### Non-vascular

Non-vascular plants do not have tubes, roots, stems or leaves. These plants soak up water and food from soil like sponges. They are also much smaller that vascular plants.

#### **Seedless Plants**

These plants have stems, roots, and leaves like other plants, but since they do not produce flowers, they have no seeds. Seedless plants can be vascular or non-vascular. Seedless plants include ferns, mosses, horsetails, and liverworts.

# **Application**

 Read the description of these two types of seedless plants and match it with the picture.

#### Seedless Vascular (Pteridophyte) Plants

Ferns are one of the most common plants found in our homes. Ferns produce spores underneath their leaves. Ferns have a water transportation system that helps them grow bigger.



Mosses are small, soft and spongy plants that grow only a few inches tall. They grow in clumps and form a sort of a carpet on the ground.





#### Classification Based on Growth Habits

Based on their growth habit, plants are broadly categorized into three groups.

#### Herbs

Herbs are plants with leaves, seeds, flowers, and a single stem. People can eat or use them to flavor foods or oils.

#### Shrubs

A shrub or bush can have multiple stems from the bottom up. A shrub has many stems from which leaves grow.

#### **Trees**

A tree has one long stem called a trunk. The trunk grows upwards, and branches and leaves grow outwards.

# **Application**

 Classify the following pictures as a shrub, herb or tree. Circle the flowers and seeds in each picture.



Tree – Single, long stem with many branches.



Herb - Single stem



Shrub - Multiple stems



# Hands on!

Create art with stems and leaves!

#### You will need

Different types of leaves, stems and flowers around your school, paint, paper.

#### Instructions

- 1. Collect different types of leaves, stems and flowers around your school.
- 2. Paint the stems and use them as stamps.
- 3. Paint the leaves and print them on your paper.
- 4. Be creative!







#### Learning goals

 Recognize the functions of the root, stem, and leaves of the plant, including respiration, food production, and storage.

#### Standard

• Describe the characteristics and mechanisms of plant reproduction.

#### Content

- What is photosynthesis
- How do plants capture sunlight
- Phases of the photosynthesis process
- Reproduction of flowering plants
- Reproduction of non-flowering plants



#### **Key Language**

**carbon dioxide.** An odorless and colorless gas released by respiration.

**energy.** This is the ability to do work and is gotten from different resources.

**chlorophyll.** This is the pigment which makes plants green.



# **Science and Technology**

 Ask students to watch the video about photosynthesis.



 Students talk about how plants make their own food. They can describe the differences between the way in which plants and people make food.



# **Complementary Activities**

#### Warm-up

• When introducing the topic, ask students to talk about plants and their lifecycles.

- Students design a poster to show how plants and humans depend on each other's respiration processes.
- Students are divided into two groups. Group 1 states a characteristic of a flowering plant's reproduction, upon where group 2 must state the difference in that characteristic for a non-flowering plant's reproduction.
- Advanced students can research gymnosperms and find different pictures in magazines, newspapers, the internet, etc. They create a collage of plants in this category.
- At the end of the lesson, ask: What is needed for photosynthesis to take place? What is the most important energy source for plants? Can you name the different stages of photosynthesis? How do flowering plants reproduce? How do non-flowering plants reproduce? What is a gymnosperm? What is a spore?





#### Learning goals

- Classify animals according to vertebrates and invertebrates.
- Describe the main groups and subgroups of animals, as well as the characteristics to define them.
- Relate vertebrate and invertebrate animals to their habitat.

#### **Standard**

Classify animals according to their specific characteristics and functions.

#### Content

- Vertebrate or invertebrate
- Vertebrates
- Types of invertebrates by habitat
- Terrestrial invertebrates
- Aquatic invertebrates



# **Key Language**

**x-ray.** A digital image of the internal make-up (bones) of the body.

**poisonous.** A substance from an animal or plant that is harmful, or even deadly.

**segmented.** Longitudinal parts of an animal's body.



# **Science and Technology**

 Ask students to watch the video about vertebrates and invertebrates.



 Students talk about the characteristics of vertebrates and invertebrates, they identify and classify them.



# **Complementary Activities**

#### Warm-up

• When introducing the topic, ask students to discuss x-rays and what x-ray images show them.

- Teacher displays different x-ray images of animals and students have to guess the name of the animal.
- Students design a poster by drawing or cutting pictures from magazines and categorizing them as the five groups of vertebrates: mammals, birds, amphibians, fish, and reptiles. They then write 1 to 2 sentences about the category's characteristics.
- Advanced students can work in pairs and draw a picture of their favorite terrestrial invertebrate. They exchange pictures and label them according to their characteristics.
- At the end of the lesson, ask: Is your favorite animal a vertebrate or invertebrate? Have you ever had an x-ray taken? What are the vertebrate groups?



# **Lesson 5** Photosynthesis and **Plant Reproduction**



#### Warm-up

The following images show parts of a plant's life cycle. Number the pictures in the correct order to represent the life cycle. Then, use your own vocabulary to write the names of each stage under the picture.



Seed









Vocabulary Match the picture with the word. carbon dioxide energy chlorophyll

# Learning

# What is Photosynthesis?

Why do plants need sunlight? Sunlight is the energy that plants use during photosynthesis. Photosynthesis is the process that plants use to take the energy from sunlight and convert carbon dioxide and water into food. So, the basic needs of plants you have learned before expands! Plants also need carbon dioxide to live.



# **Critical Thinking**

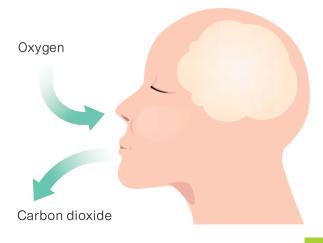
If sunlight is one of the basic needs of plants, how do plants survive during niahttime?

Plants survive at night on food produced during photosynthesis that took place during the day.



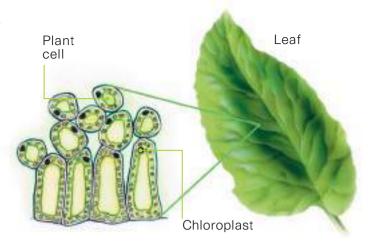
Carbon is found in the atmosphere where it's a part of carbon dioxide when fossil fuels are burned and when living organisms breathe. It's in the soil, and it's in rocks.

When carbon and oxygen bond together, they form a colorless, odorless gas called carbon dioxide.



# **How Do Plants Capture Sunlight?**

Plants capture sunlight using a compound called **chlorophyll**. Chlorophyll is green, which is why so many plants appear green. Inside a plant's cells are structures called chloroplasts. The chloroplasts contain the chlorophyll.



#### Did you know?

Although plants need sunlight and water to live, they need different amounts of each. Some plants need little water, while others need a lot. Some plants like to be in direct sunlight, while others prefer the shade.

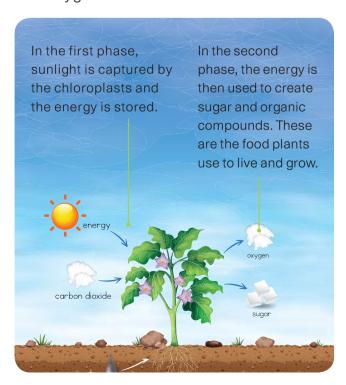


Learning

# **Phases of Photosynthesis**

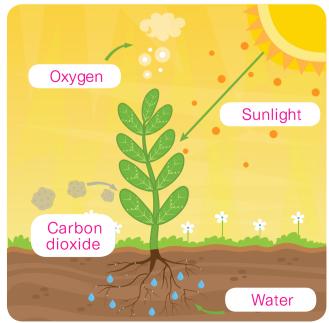
There are two main phases in the process of photosynthesis.

All plants need sunlight because they all use photosynthesis to produce energy and oxygen.



# **Application**

 Complete the photosynthesis cycle by writing the names of the elements needed by plants.



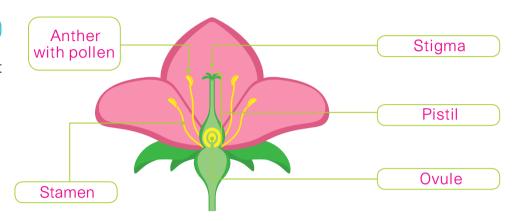
# Let's learn more about how plants reproduce.

## **Reproduction of Flowering Plants**

Flowers are complex structures with different parts. These many parts all play a big role in the reproduction of plants.

# **Application**

 Label each part of the flower involved in the reproduction process.



#### **Pollination**

When bees or other animals move around flowers, they take pollen, which forms on the anthers and move it to the pistils. Fine pieces of pollen is rubbed against the stigma. The pollen moves down the pistil to the ovules.

#### **Fertilization**

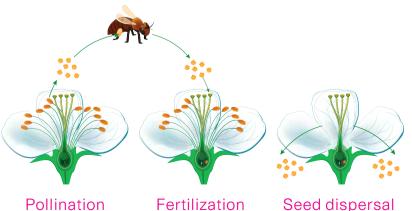
Once the pollen meets the ovule, a seed is formed. Seeds are usually formed in fruit. A berry is a fruit, and so is an apple. Vegetables can also contain seeds, like pumpkins and chillies. The seeds are then dispersed.

#### **Seed Dispersal**

Once the fruit or vegetable is mature, it releases the seeds. Seeds land on the soil and create new plants. Some seeds fly through the air. Some seeds are eaten by animals and taken to other places.

# Application

Label the stages of reproduction of flowering plants.



Have you noticed that flowering plants have both male and female parts? Well, that means that a flowering plant can pollinate itself! Self-pollination happens when a plant transfers its own pollen from the stamen to the pistil by itself. It does not need the help of bees, hummingbirds, butterflies or other insects.

# **Reproduction of Non-Flowering Plants**

There are two main groups of non-flowering plants: plants that use spores to reproduce and plants that use seeds to reproduce. Plants that make spores produce huge numbers of them. Because the spores are so small and light, they can be dispersed by the wind to new locations where they can grow. The non-flowering plants that use seeds are called gymnosperms.

#### **Gymnosperms**



Gymnosperms don't have flowers. They produce cones. The cones have seeds inside. Conifers, like pine and cypress trees, are gymnosperms.

#### **Reproduction Using Spores**



Another type of spore producing plant is the fern. Ferns produce spore casings on the bottom of their leaves.



Mosses are very small plants. They produce tiny spores in capsules. One capsule can contain from four, to more than a million, spores.

# **Application**

 Write two examples of nonflowering plants that use seeds and two that use spores to reproduce. Gymnosperms: Pine and cypress trees

Spores: Mosses and ferns



# Game Time!

Role play the life cycle of flowering and non-flowering plants starting with the photosynthesis process.

#### You will need

Paper, markers, props

#### Instructions

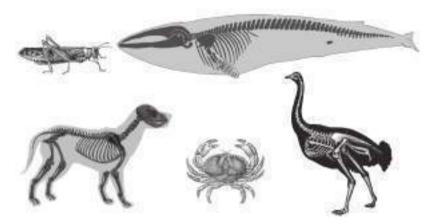
- 1. Design a play to show how photosynthesis occurs and how plants reproduce.
- 2. You will need a storyteller to announce what is happening in your play.
- 3. In your group, you will need a sun, a flower, carbon dioxide, a plant with spores, a bee, etc.
- 4. Design your own costumes using paper, markers and other props you can find in the classroom.
- 5. Take turns to perform your play in front of the class.



# **Lesson 6** Animal Diversity



All the animals in the world are part of the animal kingdom. There are two groups of animals in the animal kingdom: vertebrates and invertebrates. Can you guess what is used to classify an animal as a vertebrate or invertebrate? Look at these X-rays of animals for a clue.



The skeletons of animals are used to classify

animals as vertebrate or invertebrate.



#### Vertebrate or Invertebrate?

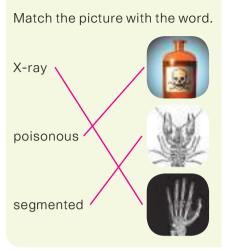
Animals that have a backbone are vertebrates, and animals without a backbone are called invertebrates. Look at the X-ray image of the dolphin. You can see the skeleton of this vertebrate. The skeleton is made of bones. Vertebrates have an endoskeleton. The word "endo-" means "within" or "internal."

What about the grasshopper and the crab? Why can we not see their bones? This is because invertebrates do not have a skeleton made of bones. The grasshopper and crab have a hard shell on the outside of their bodies. The shell supports their soft bodies inside. They have an exoskeleton. The word "exo-" means "from outside" or "external." Not all invertebrates have an exoskeleton, though.

What about a jellyfish? It does not have a backbone, so it is not a vertebrate, then it must be an invertebrate. Does it have a hard, outer covering called an exoskeleton? Discuss this with your classmates.





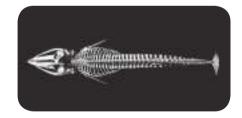


Think about it... What does vertebrate and

invertebrate mean?



Vertebrate animals have bones, and invertebrate animals do not.







# **Application**

Critical Thinking

 Look at each X-ray. Complete the table according to the example. Would you classify humans as vertebrates or invertebrates? Why?

Humans are vertebrates because we have a backbone.

Animal	Python	Macaw	Seahorse	Snail
Type of skeleton	Endoskeleton	Endoskeleton	Endoskeleton	Exoskeleton
Vertebrate / Invertebrate	Vertebrate	Vertebrate	Vertebrate	Invertebrate



#### **Vertebrates**

Vertebrate animals are classified into five groups: mammals, birds, amphibians, reptiles, and fish.

# **Did you know?**Vertebrates can be classified into five groups.



## **Application**

Match the following vertebrates to the correct group.

#### **Mammals**

They feed on milk produced by the mother when they are young. Their bodies are covered with hair or fur.

#### **Birds**

They are covered with feathers. Most birds fly, but some walk, run and even swim! They have two legs and two wings.

# **Amphibians**

They have smooth, bare skin that is thin and moist. They live both on land and in water.

Most amphibians lay their eggs in water.

# Reptiles

They are airbreathing animals that can live on land or in water. Reptiles have scales covering their body. Some reptiles are poisonous.

# Fish

They are covered with scales. They live in the water and have fins. They breathe through gills. Fish can be found in most water bodies.











# **Types of Invertebrates by Habitat**

Let's learn more about invertebrates!



All living beings need somewhere to live - bugs included! Invertebrates live on land (terrestrial), in the sea (marine) and in bodies of water, such as lakes and rivers (freshwater). Some species, like dragonflies, live both on land and in water.

Segmented bodies

#### **Terrestrial Invertebrates**

Insects are the most common terrestrial invertebrate, but this group also includes other arthropods, mollusks (such as snails and slugs), and annelids (worms).

These invertebrates need to have special structures to deal with life on land. For example, earthworms have strong muscles for crawling and burrowing. Because drying out on land is a problem for them, they can keep their bodies moist.

# Arthropods – Spiders, insects and myriapods • Many legs • More than one body section Mollusks • Soft bodies • Most have a shell Annelids • Two body openings

# Application

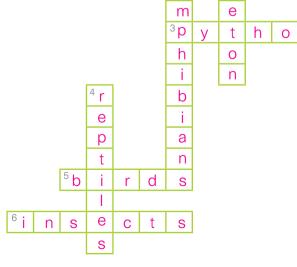
Complete the crossword with words from the text.

#### **Across**

- 3. A type of snake with an endoskeleton.
- 5. This group of vertebrates is covered with feathers.
- 6. The most common group of terrestrial invertebrates.

#### Down

- 1. Skeleton within the body.
- 2. The group of vertebrates that have thin, bare, and moist skin.
- 4. The group of vertebrates that may be poisonous.



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#### **Aquatic Invertebrates**

These invertebrates spend the majority of their lives in freshwater, or marine environments. Crustaceans and mollusks are common aquatic invertebrates.



# **Application**

 Classify each animal in the word box as vertebrate or invertebrate.

Parrot	Starfish	Lion
Spider	Crab	Octopus
Earthworm	Python	Frog
Shark	Jellyfish	Elephant

#### **Vertebrates**

Shark

Lion

Parrot

Frog

Python

Elephant

#### **Invertebrates**

Starfish

Earthworm

Octopus

Spider

Jellyfish

Crab



#### Be a Scientist

Let's investigate what vertebrates and invertebrates live in your school yard.



#### You will need

A tally sheet with vertebrates and invertebrate animals found in your environment, such as ants, slugs, grasshoppers, etc. The second column on your sheet should indicate the place where you found the animal, for example: garden, soil, office, driveway, etc.

# Steps

- 1. Use your tally sheet to find as many animals as you can.
- 2. Every time you see an animal, make a check.
- 3. In groups, discuss which animal you saw the most.
- 4. Is it a vertebrate or invertebrate?
- 5. Classify the animals you found into the different vertebrate and invertebrate groups.



#### Learning goals

- Systemize the concept of diversity by classification of the elements from which it derives.
- Emphasize the importance of balance between the different elements of an environment.

#### Standard

Classify natural resources, identifying conservation strategies to avoid alteration in ecosystems

#### Content

- Natural and artificial environments
- Natural elements in an environment
- Cycle of organic and inorganic matter
- Human-made elements in the environment
- Making changes reduce, reuse, and recycle



# (ev Language

recycle. Change waste into something reusable.

organic. It is related to living matter.

inorganic. It is not related to living matter.



# Science and Technology

 Ask students to watch the video about pollution.



• Students brainstorm ideas on how humans can reduce pollution to create a clean and balanced environment.





# Complementary Activities

#### Warm-up

 When introducing the topic, ask students to discuss their environment now, compared to long ago.

- Students take a walk around the school and then write a list of all the natural and artificial things they can find.
- Students find a piece of trash and recycle it into something reusable, such as making a pencil case from a plastic bottle.
- Advanced students can research the effects of either increased land, water, or air pollution and write a paragraph about the importance of reducing that type of pollution.
- At the end of the lesson, ask: What are some natural environments in Honduras? What are some artificial environments in Honduras? Do you live in a natural or artificial environment? How does organic matter get recycled? How can we combat pollution?





#### Learning goals

 Recognize that in an environment, all living things depend on each other and other elements.

#### Standard

 Classify natural resources, identifying conservation strategies to avoid alteration in ecosystems.

#### Content

- What is biodiversity
- The importance of biodiversity
- Adaptations and biodiversity
- Endangered animals
- Measuring biodiversity



#### Key Language

**diversity.** The differences that exists between species, like race, ethnicity, gender, etc.

**construction.** This is the process of building something, usually something large.

**extinct.** This is when a plant or animal species has died out.



#### Science and Technology

 Ask students to watch the video about the importance of biodiversity.



 Students discuss the importance of biodiversity and how it can ensure that species adapt to not become extinct.



# **Complementary Activities**

#### Warm-up

• When introducing the topic, ask students to talk about diversity between them and their friends, their families, celebrities, etc.

- Students play "Bingo." They fill a blank game board by writing words or drawing pictures related to biodiversity and then have the teacher call out the words.
- Students are divided into groups. Each group chooses an extinct Honduran animal and designs a poster with information relevant to the animal's origin, ecosystem, eating habits, reason for extinction, etc.
- Advanced students can research how different Honduran animals have adapted to their environments in order to survive.
- At the end of the lesson, ask: What is diversity? What does biodiversity mean? Do living things depend on each other to survive? What can happen if you remove an animal from an ecosystem? What part does fungi play in biodiversity? What does extinct mean? Have you ever witnessed an animal becoming extinct? What is the biodiversity index?



# Natural or Artificial Origin of the Elements of the Environment

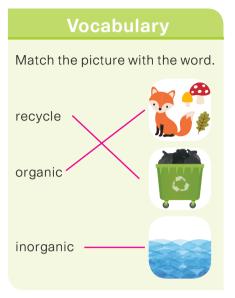


Warm-up

Have you ever wondered what Earth looked like before humans started to make changes to the environment? Almost everywhere we look, we can see how people changed or are still changing the environment.

Draw a picture of what you think your school environment looked like before your school was built.

Student's picture should include fresh air, many trees, animals and other natural elements such as water sources and soil.



Learning

#### **Natural and Artificial Environments**

Natural environments include all living and non-living things that are naturally on Earth. It is the parts of an environment that have not been influenced or changed. The environment that has been changed by humans can be called "the artificial environment." Many natural environments have an interaction between nature and humans. For this reason, the term ecosystem has been used to describe an environment that contains nature, including people.



# **Critical Thinking**

What would happen if we run out of space to build things on?

All plant and animal ecosystems would cease to exist.

# **Application**

 Circle the natural environments and draw a triangle over the artificial environments.



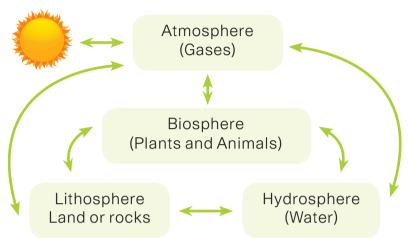






#### Natural Elements in an Environment

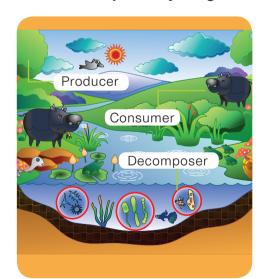
The natural environment is made up of four components with interactions between all four. All four components need each other.



# **Cycle of Organic and Inorganic Matter**

Water and minerals are inorganic matter, and living things make up organic matter. The cycle of organic and inorganic matter is nature's way of recycling.

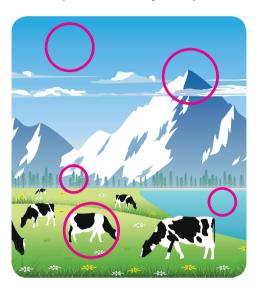
- The cycle of matter begins when producers transform inorganic matter into organic matter through photosynthesis.
- Consumers pass this organic energy to others in the food chain.
- When animals or plants die, bacteria and fungi are responsible for decomposing them, so that plants can use the nutrients left behind.



When the decomposers convert organic matter into inorganic matter, the cycle of matter ends. This cycle is important because it allows the maintenance of natural balance.

#### **Application**

 Look at the diagram. Circle the atmosphere, biosphere, lithosphere, and hydrosphere.

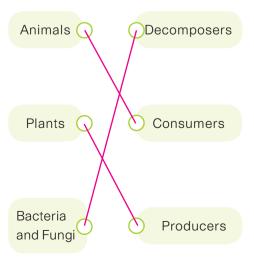


Did you know? Nature can also recycle.



# **Application**

 Draw a line to match the living things with their role in nature.



# **Human-made Elements** in the Environment

Let's learn more about human-made elements in the environment.



All living things on Earth have basic needs. Humans have caused so many changes resulting in many living things not getting what they need and becoming extinct. Human activities damage ecosystems by adding unnatural elements.

#### **Land Pollution**

We all depend on farms for food, but agriculture has destroyed many ecosystems and animal habitats. Farming also produces a lot of pollution. Chemicals from pesticides can pollute the soil and, eventually, the water supply.



#### **Air Pollution**

Air pollution and the release of gasses, like gases from factories, into the atmosphere can have many negative effects on the environment, such as the increase of temperature. This is called global warming.



#### **Water Pollution**

Some human causes include sewage, pesticides and fertilizers from farms, waste water and chemicals from factories, silt from construction sites, and trash from people littering. Pollution in the water can reach a point where there will not be enough oxygen in the water for the fish to breathe.

# **Application**

• Look at the pictures and label the type of pollution caused by humans.



Land pollution



Air pollution



Water pollution

#### Making Changes - Reduce, Reuse and Recycle

A lot of people have worked out ways that are likely to help our environment. We are already starting to make a difference. We all need to try to change our ways to help the environment and ourselves. Recycling materials can produce less pollution that help keep our environment clean. Recycling is a way to take trash and turn it into new products.

There are a number of benefits from recycling. These include:

Landfills - Recycling materials mean less trash. This saves space in dumps and landfills.

Resources - When we use materials again, it means we will take fewer resources from the Farth.

#### **Something Important**

This symbol is included in packaging, tetra pack boxes or carton boxes. It means that this material has been used before and reused to manufacture raw material. These materials are called degradable, which means that they decompose into soil and do not cause harm to nature.



#### **Application**

 Write down things you are already doing at home or at school that are helping the environment.

Student's answers may include switching off the lights, closing the tap while brushing their teeth or using both sides of the paper to draw pictures.



# Hands on!

Design a poster to raise awareness of the importance of the three R's in your community.

#### You will need

Big piece of paper, pictures, and markers

#### Instructions

- 1. In groups of 4, create a poster that will explain the importance of reuse, reduce and recycling of materials.
- 2. Your poster should provide ways for people to do it at home, at work and at school.
- 3. Make sure to explain the difference between the three R's.
- 4. Invent a creative acronym or symbol to capture people's attention.
- 5. Put it up around your school!



# **Lesson 8 Biodiversity**

Let's see how much you know about this topic.

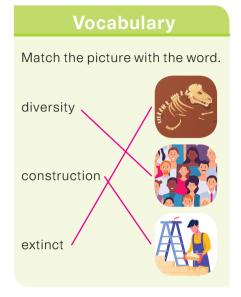




Warm-up

Are you and your friend the same? Are you different? Create a list of 3 features you might have in common with your classmates. For example, brown hair, short or tall, green eyes, etc. Walk around the classroom and find as many people you have things in common with. Count how many friends have the same features as you. Write down your observations using the table below. Even though people are all from the same species, we still have some diversity.

Feature	
Amount of people	





# What is Biodiversity?

**Application** 

Biodiversity is the term used to describe the many different living things here on Earth. These living things include humans, animals, plants, bacteria, fungi, and other living organisms.

Biodiversity is the differences among living organisms from all sources, including terrestrial, marine, and other aquatic ecosystems. This includes diversity within species, between different species, and of ecosystems.

There is a variety of habitats in Honduras, and that is why it is home to 725 bird species. Even though they are of the same bird family, they are very diverse!





Scarlet macaw

Pied-billed grebe

 Look at the pictures of two birds found in Honduras. Write the differences you can see.

One lives in water, the other one in trees, the macaw is colorful and the grebe is not, the grebe is smaller than the macaw, their beaks are also different.

It is important to keep a good balance in an ecosystem.

# Think about it...

Why is biodiversity important for animals and humans?



# The Importance of Biodiversity

The more biodiversity there is, the stronger an ecosystem will be. This is because when small changes happen, it will have less of an effect on its stability.

All living things in an ecosystem are connected. They depend on one another.

Forests provide homes for animals. Animals eat plants.

The plants need healthy soil to grow. Fungi help decompose organisms to fertilize the soil.



Bees and other insects carry pollen from one plant to another, which enables the plants to reproduce. With less biodiversity, these connections weaken and sometimes break, harming all the species in the ecosystem.

Biodiversity is important to people in many ways.

For example, plants help humans by giving off oxygen. They also provide food, shade, construction material, medicines, and fiber for clothing and paper. The cotton plant is used to make clothes.

# **Application**

 Take turns to cross out one part of the chain and explain the effect of this on the ecosystem.

Forest Bees Plants Soil Animals

If you remove fungi, animals will not be decomposed. Soil will not be fertilized. Plants may not be able to grow due to the lack of nutrients in soil.

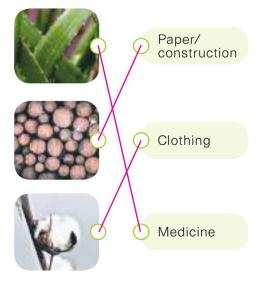
# **Critical Thinking**

What would have happened if all the animals looked the same and ate the same food?

There would have been no diversity within ecosystems.

# **Application**

 Look at the picture and match it with the correct use:



# **Adaptations and Biodiversity**

Every organism has a unique ecosystem in which it lives. This ecosystem is its natural habitat. Here the organism finds food, water, shelter from the weather and a place to breed its young. All organisms need to adapt to their habitat to be able to survive. If animals did not have these features, they would not be able to survive in their environment.



An example of adaptation to the environment is a camel. Camels live in the desert where there is little water. Their humps store extra fat to use when food is scarce

# **Application**

Use the word box and match the animals with its adaptation.

duck	elephant	chameleon	bee	spider
A spider A bee An elephant A duck A chameleon	has hairy le has a long has webbe	o to trap insects.  egs to collect and tra  trunk for reaching lea  d feet for swimming.  to a darker color to a	aves in trees.	

# **Endangered Animals**

Endangered animals are animals that are in danger of becoming **extinct**. This means that there will be no more of these animals alive on Earth. An animal is considered endangered or "threatened" when there are very few of them alive.

Some animals are more threatened than others. To keep track of how at risk of becoming extinct a species may be, scientists categorize the level of risk with a different name. From the most threatened animal to least threatened, these categories are:

- 1) critically endangered
- 2) endangered
- 3) vulnerable

# **Application**

 Can you guess the main reason why this Honduran animal is endangered?

Animal name: Honduran

Spiny-tailed

Iguana

Reason: Habitat loss



#### Did you know?

We can measure biodiversity. It is important to keep the balance in an ecosystem.



# **Measuring Biodiversity**

Biodiversity is used as a measure of the health and balance of an ecosystem. It is used to see if there is a danger that some species might become extinct. Biodiversity index describes the total number of different species within an ecosystem.

Before you do the experiment, let's see if you are able to use the biodiversity index correctly.

Total number of different species Biodiversity Index =

Total number of living items

0.625

## **Application**

 Count the number of different species. Then count the total number of living things in the pictures. Use the formula to work out the biodiversity index.











These animals do not belong to the same ecosystems. This exercise is only for practice purposes.



# Be a Scientist

#### You will need

Biodiversity worksheet (prepared by your teacher), a pencil, a calculator

# Steps

- 1. Head outside with the worksheet and a pencil. Count the various organisms living in your chosen area.
- 2. You want to count both the types of species and the number of living organisms. Here's our example for trees: 2 pine trees, 2 oak trees, 1 lilac tree, 1 hedge tree, four species of trees and six total trees. You'll need to have both numbers when you calculate your biodiversity index. This tells you how diverse your area is, and it allows you to compare it to other areas.
- 3. Be sure to put a date on your worksheet so you know when you recorded the items! Some things won't change much (like your tree count), but others (such as flowering plants) will change a lot from season to season.
- 4. Your teacher will help you work out the biodiversity index of your area.



#### Learning goals

Understand how plants, animals, fungi, and microbes interact in the food chain.

#### **Standard**

 Classify natural resources, identifying conservation strategies to avoid alteration in ecosystems.

#### Content

- The flow of energy
- Food chains
- Decomposers
- Food pyramids
- Food webs



# **Key Language**

**producer.** An autotroph that is part of the first level of the food chain.

**consumer.** A heterotroph that gets food from organic matter or other organisms.

**decomposer.** An organism that breaks down decaying or dead organisms.



# Science and Technology

 Ask students to watch the video about producers, consumers, and decomposers.



 Students are divided into three groups and are given ten points each. Group 1 names a producer, group 2, a consumer, and group 3, a decomposer. The team who cannot name one of these loses a point.



# **Complementary Activities**

#### Warm-up

When introducing the topic, ask students to talk about their food likes and their origin.

- Students use five paper cups to make a stacking food chain by drawing on the cup or pasting a picture to the cup, of an organism for every level of the food chain.
- Each student in the class names an organism that can be part of a food web. Students then use those animals and create their own food web.
- Advanced students can design their own food pyramid for an aquatic ecosystem.
- At the end of the lesson, ask: What do all living things need? What is a food chain?
   What is an herbivore? Are you an herbivore, carnivore, or omnivore? Can you name some animals that are omnivores? What is a decomposer? Can you name different decomposers? What is a food web?





#### Learning goals

• Recognize that balance in nature occurs around the relationships that living beings maintain within the food chain and in the exchange of gases.

#### Standard

 Classify natural resources, identifying conservation strategies to avoid alteration in ecosystems.

#### Content

- The beginning and the end of life
- Chemical nutrients
- The mighty earthworm
- Fantastic fungi
- Composting



#### **Key Language**

**truffles.** A type of fungus that grows underground and can be eaten.

**decay.** Organic matter that gets broken down by fungi, bacteria, or other organisms.

**compost.** This is a mixture of decayed plant, vegetable, and fruit waste that is added to soil to help plants grow.



# Science and Technology

 Ask students to watch the video about earthworms.



• Students make a class worm farm. Take a big plastic container and line the bottom with torn newspaper. Wet the paper and add 2 to 4 cups of soil. Add earthworms. Only feed them fruit and vegetable scraps.



# **Complementary Activities**

#### Warm-up

• When introducing the topic, ask students to discuss soil and the role it plays in nature.

- Students walk around the schoolyard and find different soil samples. They discuss whether they think it is nutrient rich and good for sustaining plant life.
- Divide students into three groups and have each group share a short presentation or role-play about one type of decomposer.
- Advanced students can research the nitrogen cycle and create a drawing with labels.
- At the end of the lesson, ask: What happens to plants or animals when they die? Why are earthworms significant? What uses do we have for fungi? Can you explain the cycle of decay? What happens when you compost organic material?



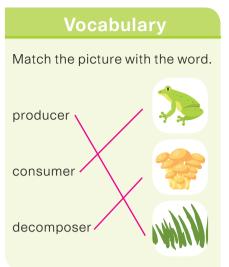
# Lesson 9 Food Chains





Talk with your friends about your favorite food. Discuss with them where your favorite food comes from. Is it a plant, or does it come from another animal? Then, complete the chart by filling in the information.

Names	Favorite Food	Plant / Animal
(your name)	O.A.	O.A.
(your friend's name)	O.A.	O.A.





# The Flow of Energy

Think about it... Where does your favorite food come from?



All living things need energy to stay alive. They get their energy from food. Plants don't eat food because they are autotrophs. Plants are producers that make their own food through photosynthesis. Humans and animals consume plants to get energy.

Food comes from farms and is sold in supermarkets.



The sun gives heat energy to plants.



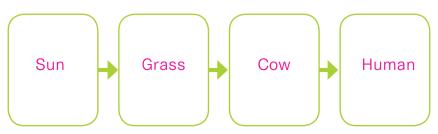
Plants use the heat energy to make food as producers.



Consumers (humans and animals) eat plants for energy.

# **Application**

 Do you like to eat beef? Draw pictures of a basic food chain for you to eat beef.



#### What is an autotroph?

Autotrophs are organisms that are able to produce their own food. Humans are not autotrophs since we cannot make our own food. We have to eat plants and animals to get energy.

#### **Food Chains**

A food chain explains the flow of energy from one organism to another. It shows the path energy takes in an ecosystem.

In the first example below, the **producer** (corn) made its own food using sunlight. The rat is next in the food chain and gets its energy from eating the corn. The owl gets its energy by eating the rat.

Think about it... Is there more than one food chain?

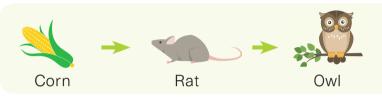


Yes, otherwise we will only eat one thing.



# **Critical Thinking**

Do you think food chains can have more than 3 links? Discuss with your friends.



A three linked food chain



A four linked food chain



A five linked food chain

Animals cannot make their own food so they must eat plants and/or other animals. They are called consumers. There are three groups of consumers.

#### Herbivores

These animals eat plants.
They are also called primary consumers.

#### **Carnivores**

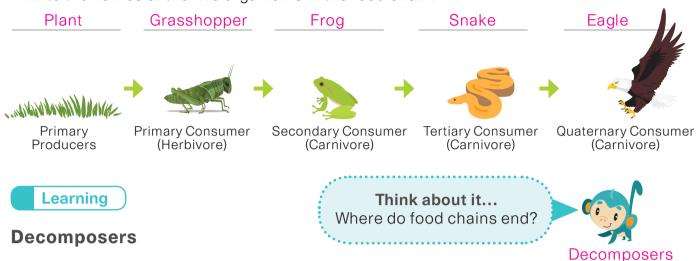
These animals eat other animals.
Carnivores that eat herbivores are called secondary consumers, and carnivores that eat other carnivores are called tertiary consumers.

#### **Omnivores**

These animals eat other animals and plants.



Write the names of the five organisms in the food chain.



At the end of the food chain are the decomposers (bacteria, mushrooms, (fungi), and even some worms), which feed on decaying matter. Overall, the main **decomposer** organisms in marine ecosystems are bacteria. Decomposers speed up the decaying process that releases mineral salts back into the food chain for absorption by plants as nutrients.







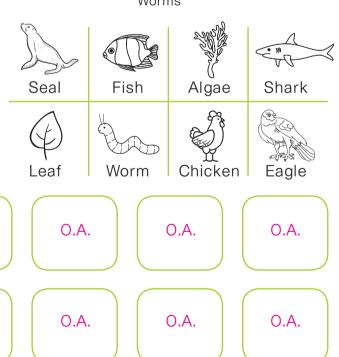
Mushrooms Bacteria

O.A.

O.A.

# **Application**

 Can you create your very own on land and in water food chain with all the information you have learned? Draw pictures of the food chains and color them. Use the pictures on the right if you need help! Remember the decomposers!



# **Food Pyramids**

Food chains can also be represented in different forms, such as this pyramid.



Can you explain the food pyramid of a lion?

Trees at the base level feeds giraffes. The giraffes are eaten by a lessor amount of lions.

Further along a food pyramid, there are less and less consumers.

As you go up, there are less grasshoppers than grass, and even less owls than snakes.

As this pyramid shows, a big number of living things at the base is required to support a few at the top. Many herbivores are needed to support a few carnivores.

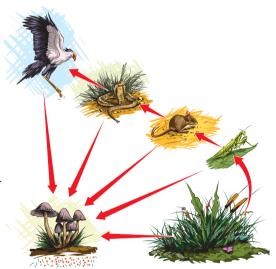


#### **Food Webs**

Most animals are part of more than one food chain and eat more than one kind of food in order to meet their food and energy requirements. These interconnected food chains form a food web. Food chains can get complicated because animals usually eat a variety of food.

A food web shows how every organism is involved with several other organisms. Cows might be food for humans, bacteria, or flies. Each of those flies might be connected to frogs or spiders. There are dozens of connections for every organism. When you draw all those connecting lines, you get a web-like shape.

omnivores



producers

consumer

# **Application**

decomposers

• Test your understanding. Complete the sentences using the vocabulary provided.

carnivores

In a food chain, plants are called the <u>producers</u> because they make their own food.

The next animal to eat the plant is the primary <u>consumer</u>. This organism is usually an <u>herbivore</u>. After the consumer follows other consumers, which can be <u>carnivores</u> or <u>omnivores</u>. Last are the <u>decomposers</u> which are fungi or bacteria.

herbivore

# **Lesson 10** Cycles of Nature



Soil is the loose upper layer of the Earth's surface where plants grow. Soil consists of a mixture of organic material and broken bits of rocks and minerals. At first you may think of soil as just dirt, something you want to get rid of. However, soil plays a very important role in supporting life on Earth.

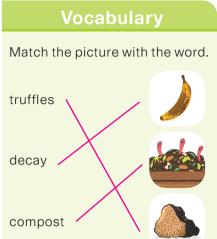
Mark X on the pictures that show the importance of soil.











Learning

# The Beginning and the End of Life

Many plants need soil to grow. Plants use soil not only for nutrients, but also as a way to anchor themselves into the ground using their roots. Living organisms such as animals, fungi, and bacteria rely on soil as a place to live.



Think about it... What is the role of decomposers?





When plants and animals die, they become food for decomposers like bacteria, fungi, and earthworms. Decomposers or saprotrophs recycle dead plants and animals into chemical nutrients like carbon and nitrogen that are released back into the soil, air and water.

Application

 With your knowledge from the previous lesson, label the three types of decomposers.



Mushrooms/Fungi



Bacteria



Worms



# **Critical Thinking**

Do you think life on Earth would be possible without decomposers? How so?

No, because nutrients and minerals will not get recycled back into the soil.

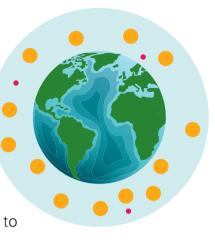
Nutrients come from the carbon that is released when a plant or animal decays.

# Think about it... Where do all nutrients come from?



#### **Chemical Nutrients**

All living organisms have carbon as the basis for life. When plants and animals decay, the carbon in their body will either be released into the atmosphere or stored in the ground as fossil fuels. Fossil fuels are natural resources such as coal and oil. It takes millions of years to be formed!



Around 78% of the atmosphere is nitrogen. However, most of it cannot be used by animals and plants. The nitrogen cycle describes how nitrogen moves between plants, animals, bacteria, the atmosphere (the air), and soil in the ground. The most important part of the cycle is bacteria. Bacteria changes the nitrogen so it can be used by plants, and then it gets passed on to animals when they eat the plants.

Nitrogen **78%** 

• Carbon dioxide 1%

# **Application**

• Number the pictures to show the decay process of an apple.











Learning

# The Mighty Earthworm

There are over 1,800 species of earthworms. Earthworms eat dead plants and animals. When they eat, they also take in soil and tiny pebbles. They take in nutrients from microorganisms in the material they eat.

They then excrete waste in the form of casts. Casts are rich in nutrients that help plants to grow.



Earthworms also help loosen the soil so air can move around.



# **Application**

• Draw pictures to illustrate the importance of earthworms.



Picture of an earthworm excreting casts.

Picture of an earthworm as a decomposer. For example, eating an apple.

Picture of an earthworm loosening soil and creating air bubbles.

• Write T for true and F for false.

	True of False
Worms are the only decomposers.	F
Decomposers eat dead plants and animals.	Т
Around 50% of the atmosphere is nitrogen.	F
Carbon is stored in all living organims.	Т
Soil consists only of dead material.	F

# Learning

# **Fantastic Fungi**

Fungi like mushrooms, mold, and toadstools are not plants. They don't have chlorophyll, so they can't make their own food. Fungi releases proteins that decompose dead plants and animals. Fungi absorb nutrients from the organisms they are decomposing. Some fungi are helpful for medicine and food. Others can be harmful.



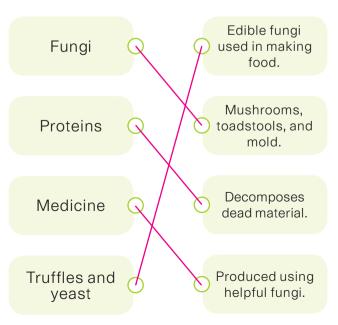
**Truffle** mushrooms are used in food.



Some fungi are harmful, like wild mushrooms.

# **Application**

 Match the words with the correct statement.



# Think about it... Where does all the waste go?



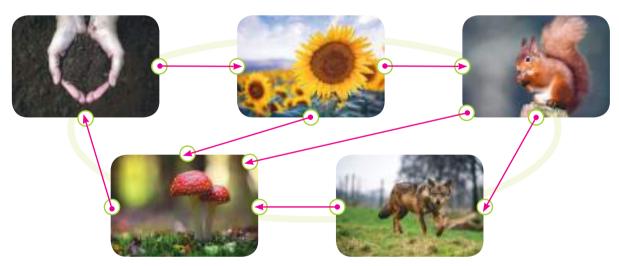
It becomes compost that is nutrient-rich soil, helping plants to grow.

# **Composting**

Recycling occurs in nature every day. For example, leaves that have fallen to the ground decompose and turn into compost. **Compost** is nutrient-rich soil that helps plants to grow.

Can you complete the compost cycle as part of a food chain? You have learned about food chains in the previous lesson. Now let's put it all together! Complete the cycle by drawing arrows to show how all of the pictures in the diagram are connected.

# The Decay Cycle





# **Compost Sensory Bin**

A lot of people make their own compost at home using leftover food, eggshells, dead leaves, and earthworms. For this project, we will choose the less smelly option! If you have the space at home, you can ask your parents to make a real compost bin!

#### You will need

Tray/box, soil, eggshells, lemon peels, leaves, gummy worms, play animals, plastic plants



#### Instructions

- 1. Use your materials and build your own compost area.
- 2. Spread your animals and plants around your tray on the soil.
- 3. Discuss in groups how the decay cycle works using your gummy worms, animals, and plants.



#### Learning goals

 Recognize that all living things depend on each other and on other elements in the environment.

#### Standard

• Classify natural resources, identifying conservation strategies to avoid alteration in ecosystems.

#### Content

- Balance in an ecosystem
- Drivers and ecosystems
- Natural disasters
- Impact of natural disasters on the environment
- Human activities that change an ecosystem



# **Key Language**

**natural.** This is something that comes from nature and its creation has no influence from humans.

**human influenced.** This is when nature has been influenced by human action in some way.

illegal. An activity that is against the law.



# Science and Technology

 Ask students to watch the video about surviving natural disasters.



 Students discuss different natural disasters and draw a picture of one thing they can do to survive during those disasters.



# **Complementary Activities**

#### Warm-up

• When introducing the topic, ask students to discuss different people in the community and the role that they play.

- Students identify an ecosystem and explain one natural and one human-influenced driver, that can have an impact on an ecosystem.
- Students identify some illegal hunting and trade of Honduran animals and discuss the implications for the species, as well as the community.
- Advanced students can research a natural disaster that happened in Honduras and explain its aftermath.
- At the end of the lesson, ask: What is an ecosystem? What does it mean for an
  ecosystem to be balanced? What different roles do organisms play in a food
  pyramid? Can you name some natural disasters that happened in Honduras? How do
  natural disasters impact communities and nature? What should you do in the event of
  a natural disaster? Why are humans sometimes dangerous to ecosystems?





#### Learning goals

 Recognize the importance of movement in human beings through the different actions where it intervenes.

#### Standard

• Describe some characteristics, functions, and care of the organs of the skeletal and muscular systems of the human body.

#### Content

- The skeleton and its parts
- Functions of the skeleton
- The importance of taking care of your bones
- The muscles



#### Key Language

**involuntary muscle.** Muscle that contracts without conscious control and found in walls of internal organs.

**femur.** Bone located within the human thigh.

**elastic.** Capable of returning to its original length, or shape after being stretched, deformed, compressed, or expanded.



# Science and Technology

 Ask students to watch the video about how bones work.



 Students complete the song in the video and try to dance along with it. Work in groups, each group can present their dance to the class.



# **Complementary Activities**

#### Warm-up

• When introducing the topic, ask students to move their bodies. Ask them if they can name a few bones and muscles that they used to move the way they did.

- Hand out pictures of the different parts of a skeleton. Have students paste them on a large paper at the correct places so it would form a complete skeleton. Name the bones. Then, they can draw in the different types of muscles and try to name them.
- Have students create a pamphlet where they give tips for healthy bones and muscles.
   Include exercises like weight training and some cardio for strengthening muscles and food that can be eaten to keep the bones strong.
- Advanced students can research why the heart is an involuntary muscle and what would happen if it were a voluntary muscle.
- At the end of the lesson, ask: What are the different parts of the skeleton? Name the functions of the skeleton and explain each one. Which two types of muscles do we have? Can you give examples of each of the muscle types?



# **Lesson 11** Alterations of Ecosystems



Warm-up

In a community, there are many jobs that help keep things running smoothly. A doctor, mail carrier, garbage man, waitress, and farmer all play an important role in our society. Make a list of four people in your community that you need in your life and their importance to you.

Person's/job title	Importance to you
Ex: My teacher	She teaches me and this will help me to get a job one day.
Ex: My driver	He brings me to school when mommy is working.
O.A.	
O.A.	





# **Critical Thinking**

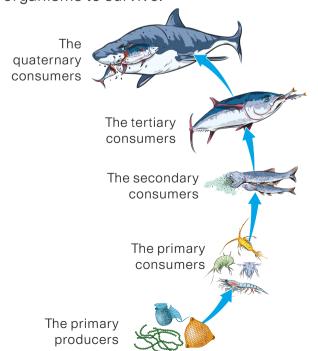
How would it affect your life if one of the people above were removed?

O.A. For example, without a teacher children would not get the necessary skills to improve their level of education and improve their knowledge.

Learning

# **Balance in an Ecosystem**

Like people in your community, animals and plants also have specific roles in ecosystems. When you learned about food chains, you also learned about a food pyramid that has to be in balance in order for organisms to survive.



The quaternary consumers feed on the primary, secondary, and tertiary consumers.

The secondary and tertiary consumers feed on the primary consumers as well as the producers.

The primary consumers feed on the producers. They are normally herbivores. There have to be many herbivores to provide enough energy for the next levels.

The producers make food for all the levels above it. They are the biggest group. If they were a small group, there would not be enough energy for the levels above.

## **Drivers and Ecosystems**

# Think about it... Who or what causes the changes in an ecosystem?



Even if an ecosystem is balanced, that doesn't mean that no changes ever occur. Ecosystems have living components, such as plants and animals, but also non-living components, like air, water, soil, and rocks. Drivers are any events or processes that change an ecosystem.

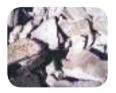
Animal behavior, such as a bear or mountain lion leaving its habitat in search of new territory, could also have an impact on an ecosystem because now it becomes part of another food pyramid. Animal behavior in an ecosystem is **natural**, but it can alter (change) an ecosystem.

Drivers in ecosystems can also be human influenced.

#### **Natural Disasters**







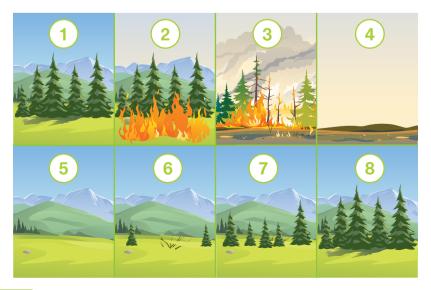




The pictures above are the result of natural events. Natural events happen in nature and can cause widespread damage to land and property, and threaten the lives of humans and wildlife. These events can happen quickly with bad results. Natural events can also be very dangerous because they can trigger secondary events, like fires, power outages, and other dangerous conditions.

# **Application**

 Look at the picture of a forest fire and number what you see in the correct order.



1	The sun shines on the forest.
5	Little parts of the plants start to grow again.
8	The ecosystem is restored.
2	The forest is on fire.
4	The whole ecosystem is destroyed.
6	The plants grow bigger.
3	The forest fire burns away the plants.
7	The ecosystem starts to develop again.

#### Impact of Natural Disasters on the Environment

Forest fires are large uncontrolled fires that take place in the forest. Forest fires are a type of wildfire. Other types of wildfires include grass fires, brush fires, and hill fires. Most fires that are started by natural causes are started by lightning. Other natural causes include volcanic eruptions and sparks from falling rocks.



Forest fires



Floods

Flooding is a natural event where a piece of land (or area) that is usually dry land suddenly gets buried under water. Flooding is caused when there is heavy rain for a very short period. Another cause of flooding includes rivers overflowing and sea water carried by massive winds and hurricanes onto dry coastal lands. This causes a lot of damage to ecosystems.

Earthquakes are the rumblings, shaking or rolling of the Earth's surface. It is usually what happens when two blocks of the Earth suddenly slip past one another or break apart from each other as a result of tension. Earthquakes change a habitat dramatically and can hurt animals and plants.



Earthquakes

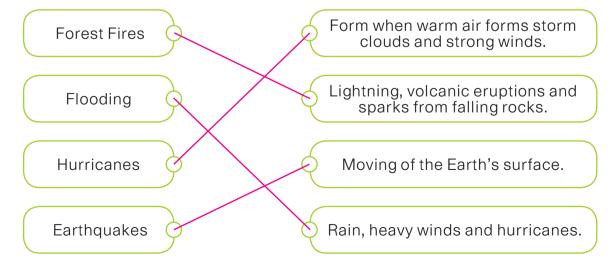


Hurricanes

A hurricane, like other natural disasters, cause great damage. It is a powerful, spiral wind. Hurricanes carry a lot of rain and heavy winds. Hurricanes form when warm air on the ocean surface rise quickly and form storm clouds and strong winds.

#### **Application**

• Match the causes of each of the following natural disasters.



#### **Human Activities That Change an Ecosystem**

#### **Pollution**

Humans alter the ecosystems by polluting water, air, and land habitats. Pollution of these three habitats can be caused by different activities you are already familiar with.

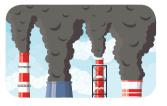
Did you know?
An estimated 2.2
billion tons of
waste is dumped
into the oceans
every year.



#### **Application**

• Label the following pollution activities as water, land, or air pollution.









Land

Air

Water

Land

#### **Hunting and Illegal Sale of Species**



Some examples of **illegal** wildlife trade are well known, such as poaching of elephants for ivory and tigers for their skins and bones. Hunting creates an imbalance in the natural elements of the environment. Hunting any part of a food pyramid causes changes in a level that might have an effect on the whole food pyramid.



#### Be a Scientist

In this experiment you will test how flooding changes a habitat with and without vegetation.

#### You will need

Small to medium size potted plant with holes at the bottom of the pot, a big bucket of water, stopwatch

#### Steps

- 1. Go outside with the potted plant and pour the bucket of water over it. Using your stopwatch, test how long it takes for the water to drain through the soil.
- 2. Remove the plant and do the test again.
- 3. Write down your results and conclusion.

#### Step 1 duration:

O.A.

#### Step 2 duration:

O.A.

#### Conclusion:

Flooding moved and removed soil from the habitat. When the plant was in the pot it took longer for the water to drain through the soil. Therefore, vegetation slows down the effects of flooding.

#### **Lesson 12** The Locomotor System

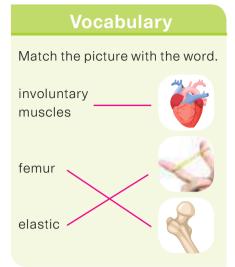


People are able to do almost anything with our bodies thanks to our specialized muscles, ligaments, and skeleton

Think of a few things you do daily. Make your list here:

Walk, eat, jump, any movement





#### Learning

#### The Skeleton

The skeleton is the body's form of support. It is also seen as the bony framework of the body which provides support, shape, and protection to the soft and delicate organs in humans and animals.

The skeleton also provides spaces for muscles to be attached.



#### Parts of the Skeleton

The adult body consists of 206 bones. Infants have about 231 bones.

The skull can be divided into two parts: The cranium with eight bones, and the face which has 14 bones.



The longest bone in the body is the femur, or thighbone.



The smallest bones in the body are the three ear bones.



#### **Application**

Choose the correct word from the box to complete each sentence.

206 bones	М	uscles	protects		femur
The skeleton	protects	the softer	organs from damage.	There are	206 bones
in the body	Muscles	attach to	attach to the skeleton. The longest bone in o		our body is the
femur					

#### Functions of the Skeleton

**Support:** Provides framework and keeps the body up straight. Without the rib cage the lungs would collapse.



Movement: Joints between the bones allow movement. Some allow wider movements, for example, the ball and socket, while the pivot joint in the neck only allows smaller movements.



Protection: It helps protect our vital internal organs from being damaged. The skull protects the brain, the backbone protects the spinal cord, and the rib cage protects the liver, the lungs, and the heart.



#### **Blood Cell Production:**

The skeleton is the place of hematopoiesis, the making of blood cells that takes place in the bone marrow. The process occurs in the long bones of the skeleton, such as the femur.



Storage: The bone matrix stores calcium and is involved in calcium metabolism. The bone marrow can store iron.



#### **Endocrine Regulation:**

Bone cells release a hormone called osteocalcin. It helps regulate the blood sugar and fat deposition.



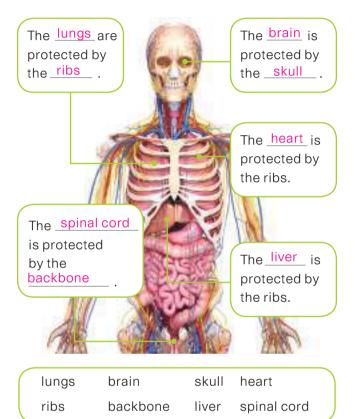
#### Did you know?

Teeth are also part of the skeleton, but they are not considered bones.



#### Application

 Complete the captions using the words from the word box.



- Answer the following questions.
- 1. What is the main function of the skeleton?

To form a support structure for a living being

2. Where do you find the smallest bones of the skeleton?

#### The ear

3. In which part of the skeleton are red blood cells produced?

Bone marrow

## The Importance of Taking Care of Your Bones

Bones are living and growing tissue. They are made of two materials: collagen (a protein that provides a soft framework), and calcium (mineral that helps with strength and hardness). These make the bones strong and flexible.

Sometimes when people get older, their bones become very weak. If you hurt yourself, it takes more time to heal.



#### **Critical Thinking**

What do you think would happen if you didn't have a skeleton? Discuss your ideas with your friends.

You would not be able to stand up straight because there would be no structure to support your body.

#### **Application**

 Write down three ways you can take care of your bones and provide an example for each.

Eat enough vegetables – name of vegetable

Eat enough protein – Meat

Food high in calcium – Milk

Weight training - Exercise

# Did you know? Babies are born with 300 bones.



#### **Tips to Take Care of Your Bones**



# **Eat Enough Vegetables**Vegetables are a great way of strengthening your bones and keeping you healthy. Vitamin C promotes the production of bone-forming cells.



# **Eat Enough Protein**If you do not eat enough protein, the total calcium that is absorbed by your bones starts to decrease.



Foods Rich in Calcium
Calcium strengthens your
bones. Calcium is one of the
major minerals that make up
your bone structure.



Weight Training
It is very effective to
improve bone density and
decreasing triggers for
inflammation and pain.



Write T for true and F for false.

Joints between bones allow movement.



Weight training is very bad for improving bone density.

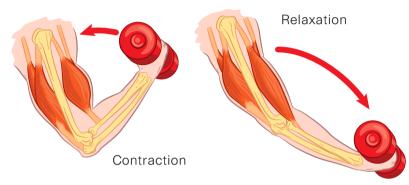


Bones are living, growing tissue.



#### The Muscles

Muscles are soft tissue that are resistant and **elastic**. They are responsible for all movement. They are joined to the bone with tendons. Muscles carry out two different movements: contraction and relaxation. When muscles contract, they become shorter and thicker. When they relax, they go back into their original shape and size.



#### **Game Time!**

Let's play **Simon Says**, using our skeleton, muscles, and joints to follow the instructions:

Everyone should stand in a big circle. Take turns giving an instruction and the rest follow the instruction. The person giving the instruction should say: "Simon says (put your finger on your nose)." Each person should get a chance to give an instruction.

Think carefully about your action, making sure you are using your skeleton, muscles, and joints. Examples: Jump rope, brush your hair, eat, run in place, etc.



#### Two Different Types of Muscles

#### **Voluntary Muscles:**

They are the muscles that move when we want them to move. Eating, talking, and kic



talking, and kicking are done voluntarily.

#### **Involuntary Muscles:**

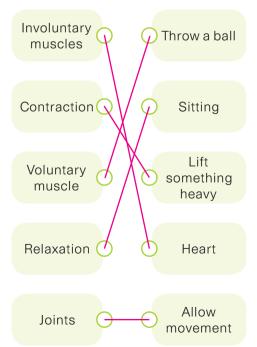
Involuntary muscles are those that move without us controlling



them. They are found in our organs. Examples include the bladder and heart.

#### **Application**

 Match each word to the correct example.



#### Lesson 13



#### Learning goals

Describe the structure and function of the respiratory system.

#### Standard

 Describe some characteristics, functions, and care of the organs of the respiratory system of the human body.

#### Content

- The function of the respiratory system
- Parts of the respiratory system
- Voluntary and involuntary breathing
- Respiratory movements
- Habits to keep the respiratory system healthy



#### **Key Language**

**trachea.** Tube-like structure in the neck and upper chest, that transports air to and from the lungs when breathing.

**intercostal muscle.** Short muscles that extend between the ribs.

**diaphragm.** Muscle that separates the chest cavity from the abdomen; main muscle of respiration.



#### **Science and Technology**

 Ask students to watch the video about how the respiratory system works.



 Students can play Pictionary by using video-related content as clues.



#### **Complementary Activities**

#### Warm-up

• When introducing the topic, ask students to discuss everything they know about breathing. Ask them how they feel when they jog and how their breathing is then, how they feel when they take a deep breath after exercising.

#### **Learning and Application**

- Have students put their hands on their chest while breathing deeply. In groups, students discuss what happens to their chest. Draw a diagram of the chest, lungs, and diaphragm. Using arrows and short explanations, let them explain why the chest is moving while breathing.
- Have students make a poster of healthy habits that can help protect the respiratory system.
- Advanced students can think of different methods that can be practiced and used to have better breathing in different situations.
- At the end of the lesson, ask: What is the respiratory system? Can you name the different parts of the respiratory system? How do inhaling and exhaling happen? Which habits can you practice to keep your respiratory system healthy?



#### Lesson 14



#### Learning goals

Describe the structure and function of the circulatory system.

#### Standard

 Describe some characteristics, functions, and care of the organs of the circulatory system of the human body.

#### Content

- Function of the circulatory system
- Parts of the circulatory system

Elements of blood



#### **Key Language**

**spleen.** Organ that is located in the upper-left part of the abdomen, keeping bodily fluids balanced.

**artery.** Blood vessel that takes blood away from the heart to all parts of the body.

**platelets.** Tiny blood cells that help your body form clots to stop bleeding.



#### Science and Technology

 Ask students to watch the video about exploring the heart.



 In groups, students discuss the function and flow of blood throughout the body. They can draw a simple diagram.



#### **Complementary Activities**

#### Warm-up

• When introducing the topic, ask students to talk about the circulatory system and how blood moves through the body.

#### **Learning and Application**

- Take red and blue tape and tape out the picture of a very big heart on the floor. Include the major arteries and veins for students to see where the blood comes from and where it goes. Students line up and become the blood flowing. Station students at heart valves where they open and shut. They control the blood (students) in each "room" of the heart by letting them in and out as the heart beats.
- Students divide into groups. Make a soup to represent the components of blood. Use four different ingredients, each represents an element of blood. While adding each ingredient, students have to explain the function, lifespan, production, and how it looks.
- Advanced students can research what would happen if we had too little of one of the blood elements in our blood. Share their findings with the class.
- At the end of the lesson, ask: What is the difference between an open and a closed system? Can you name the different parts of the circulatory system? Explain the flow of blood and the working of the heart. Name the different blood elements.



#### Lesson 13 The Respiratory System

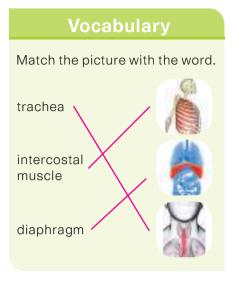


Do you like singing, laughing, or talking? You wouldn't be able to do any of those things without your respiratory system, which allows you to breathe.

Hold your breath for a few seconds. See how long you can hold it. How do you feel?

Write down how you felt when you were holding your breath.

Dizzy, off balance, weak





#### The Function of the Respiratory System

The respiratory system of a human is made up of organs that help us breathe. We need to breathe because our breathing supplies blood with oxygen, which is circulated through our body. This allows the oxygen to reach all of the body parts.

- Breathing is an involuntary and automatic process.
- When we breathe, we inhale oxygen and exhale carbon dioxide.

#### Think about it... Why is your respiratory system important?



It helps us breathe. If we can't breathe, we will die

#### Parts of the Respiratory System

The respiratory system consists of many parts.

The three major parts are: the airway, the lungs, and the muscles of respiration.

**Airway:** Includes the nose, mouth, pharynx, larynx, and **trachea**. They carry air from the body's exterior, all the way into the lungs.

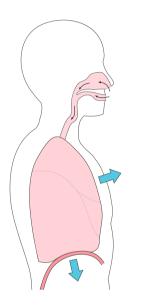
Muscles: Diaphragm and intercostal muscles act as a pump, pushing air into and out of the lungs during breathing.

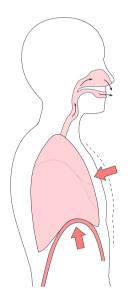


Lungs: Acts as the functional units of the respiratory system by absorbing oxygen into the body and expelling carbon dioxide out of the body.

#### **Voluntary and Involuntary Breathing**

Most of the time, our breathing is controlled involuntarily, which means we do not have to think about breathing in and out the whole time.





However, there are many instances where we need to voluntarily control how fast or how deep we breathe in. We need to control our breathing when we speak, sing, swim, exercise, when we need to control our emotions, or play musical instruments.

Voluntary and involuntary breathing use the same muscles.

#### Did you know?

The lungs are the only organs in the body that would float on water.



#### **Application**

- Write the correct part of the respiratory system for each description.
- 1. Functional units of the respiratory system.

#### Lungs

2. Made up of organs that help us to breathe.

#### Respiratory system

3. Diaphragm and intercostal muscles that act as a pump.

#### Respiratory system muscles

4. Carries the air from the body's exterior into the lungs and back out again.

#### Airway



#### **Critical Thinking**

What would happen if breathing was not an involuntary act and you had to remind yourself constantly to breathe?

You would not be able to complete any other function or activity because you would be focused on breathing.

#### Application

Circle the pictures that are part of the respiratory system.













#### **Respiratory Movements**

#### Inhalation

When you inhale air, you are expanding your chest wall and contracting your diaphragm. The diaphragm is the big, thin muscle under your lungs and heart.

The diaphragm pulls your lungs downwards and your chest wall outwards and upwards. Your intercostal muscles are responsible for this action. This causes your lungs to stretch and pull air inside. Air flows into the lungs via your nose and trachea.

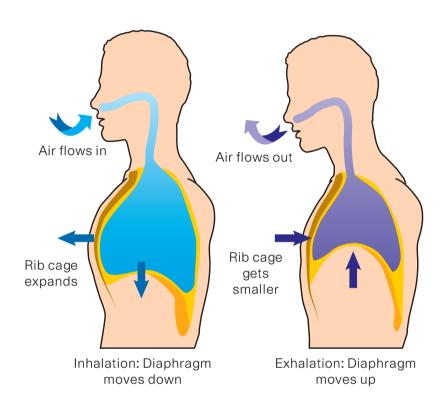
#### **Exhalation**

When you exhale, the air is pushed out of the lungs. When the rib cage decreases its size, the lungs contract and the diaphragm and the ribs go back to their original position.

#### Did you know?

Most cells require continuous oxygen supply for production of energy.





#### **Application**

 Write if the action is voluntary breathing or involuntary breathing:

Taking a deep breath:

Voluntary breathing

Breathing when you are swimming: Voluntary breathing

Breathing while sleeping:

Involuntary breathing









Write T for true and F for false.

The air we inhale is called oxygen.



While exhaling, the rib cage expands and the diaphragm contracts.



Your intercostal muscles are responsible for your chest wall to expand.



Breathing is a voluntary and automatic process.



# Habits to Keep the Respiratory System Healthy

Think about it...
How can you take care of your respiratory system?



**Avoid Tobacco Exposure:** Some of the toxic exposure will result in cell degeneration that can lead to lung cancer. Smoking can also cause sinusitis.

**Reduce Fatty Food Intake and Keep a Balanced diet:** Highfat foods might trigger asthma attacks and interfere with medication taken by sufferers of respiratory diseases.

330

Maintain High Standards of Hygiene: Respiratory diseases of viral origins are most likely caused by poor hygiene and not enough hand washing.

**Follow an Exercise Routine:** Many respiratory illnesses can be improved with regular aerobic exercises. Exercise oxygenates your lungs and increases the capacity of your respiratory system.

C

**Stay Hydrated:** When you are dehydrated, your lungs increase their size to make up for the loss of water. Their functioning becomes weak.

#### Application

Write down four habits to keep your respiratory system healthy.

Avoid tobacco exposure.

Maintain high standards of hygiene.

Reduce fatty food intake, and keep a balanced diet.

Follow an exercise routine. Stay hydrated.



#### Be a Scientist

#### What is your lung capacity?

#### You will need

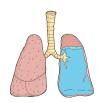
Clean plastic tube, large plastic bottle, water, large bowl

#### **Steps**

- 1. Fill the bowl or plastic bottle almost full of water.
- 2. Put your hand over the opening of the bottle and turn it upside down while holding it over the bowl.
- 3. Another student holds the bottle

- of water while you slide the plastic tube in the bottle.
- 4. Take a deep breath.
- 5. Put the other side of the tube in your mouth and blow as hard as you can.
- 6. Mark the air level in the upsidedown bottle. Take the bottle out and empty it.
- 7. Measure your lung capacity by filling the bottle to the mark. Pour the water into a measuring jug, and measure how much water it took.

 Write down your lung capacity in millimeters.



O.A.

#### **Lesson 14** The Circulatory System



The heart pumps blood throughout the body. We need blood to transport certain products to the rest of the body from specific organs.

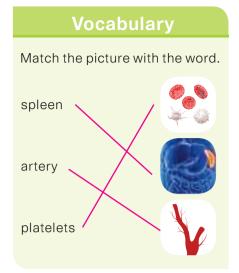
If we cut ourselves, we lose some of the blood we need.

Have your ever cut or hurt yourself that you bleed?

Write down how you stopped the bleeding.

Put it under running water, put pressure on it, and seal the wound.





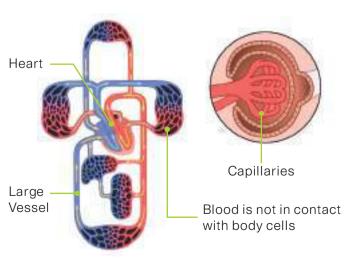
## Learning

#### **Function of the Circulatory System**

The circulatory system consists of the organs and fluids that carry materials throughout the body. The transport of blood to all parts of the body is extremely important because it carries nutrients and other important material. This is required for the nourishment and growth of the cells of every organ.

#### **Closed System**

All vertebrates have a closed circulatory system. This means that blood remains in the blood vessels and does not directly interact with body tissue.



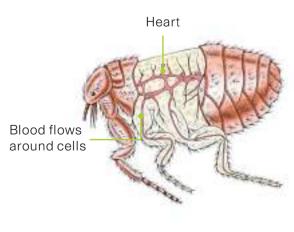
# **Critical Thinking**

What do you know about blood? What is it made of? Where does it flow in our body?

Blood is made of red and white blood cells, platelets, and plasma, and flows through the veins in our bodies.

#### **Open System**

Invertebrates have an open circulatory system. In an open circulatory system, blood is in direct contact with the cells and organs.



#### **Parts of the Circulatory System**

The three most important components are: the heart, the blood, and the blood vessels, divided into **arteries** and veins.

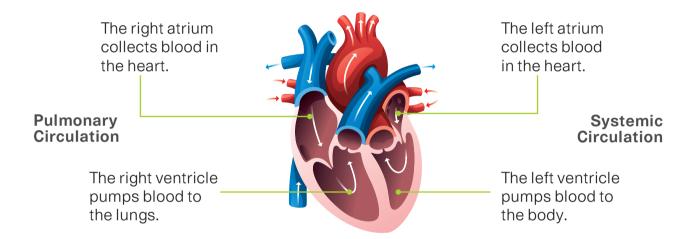
#### **Application**

 What are the three most important components of the circulatory system?

The heart, blood, and blood vessels.

#### **The Heart**

The heart is a muscle located roughly at the body's midline. It is responsible for the pumping of blood through the body. The heart is divided into four chambers:



The right side of your heart receives blood from the body and pumps it to the lungs. This is called pulmonary circulation.

The left side of the heart does the exact opposite. It receives blood from the lungs and pumps it out to the body. This is called systemic circulation.

Did you know? The human heart pumps 5 liters of blood per minute.



#### **Application**

Write T for true and F for false.

The heart is the most important organ in the circulatory system.

Arteries carry blood that is oxygenated.



Capillaries are the smallest part of all blood carried tubes.



The vessels pump the blood throughout the body.



All vertebrates have a closed circulatory system.

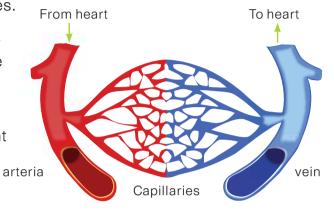


#### The Blood Vessels

There are two major blood vessels in the circulation system: those that bring blood to the heart (veins) and those that carry the blood away from the heart to the organs and tissues (arteries). There is also another type of vessel

called the capillaries.

Arteries: They carry blood away from the heart. The arteries in the systemic loop carry oxygenated blood to the different parts of the body. The arteries in the pulmonary loop carry the deoxygenated blood



**Veins:** They carry deoxygenated blood from the body to the heart.

Capillaries: Arteries break down into smaller parts called the capillaries. They are very thin and fine blood tubes that allow the exchange of gases and substances between blood and all the cells of the body.

#### **Application**

to the lungs.

• Give the correct term for each description.

The heart is a muscle. It is responsible for pumping blood through the body.

Heart

Tubes that keep the blood inside and away from direct contact with organs in the body.

Blood vessels

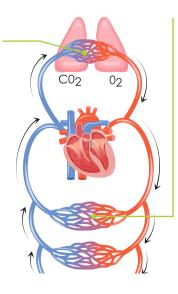
#### Learning

#### **Blood**

Blood is the connective liquid that plays a very important role in the circulation system. It is the fluid that carries oxygen and makes sure that the whole body is supplied with oxygen and the necessary nutrients. The movement of the blood is called blood circulation.

## Systemic circulation:

Carries
oxygenated
blood from the
heart to body
parts through
arteries.
This process
also carries
deoxygenated
blood from the
body to the heart
through veins.



Pulmonary circulation: After the heart receives the deoxygenated blood back from the body, the blood is pumped to the lungs to expel the carbon dioxide. It collects the oxygenated blood from the lungs and takes it back to the heart for the systemic circulation.

#### **Elements of Blood**

#### White Blood Cells

White blood cells make up only 1% of your blood but have a very important role in your body. The white blood cells protect you from illnesses and diseases. They flow through your bloodstream to fight viruses, bacteria, and any foreign invaders that threaten your health. White blood cells are produced in the bone marrow. They are stored in your blood and lymph tissues.

#### **Red Blood Cells**

Red blood cells are produced in the bone marrow of your skeleton. New red blood cell production is triggered by low levels of oxygen. As more red blood cells enter the blood circulation, oxygen in the body and blood increases. Gas exchange is the main function of the red blood cells.

#### **Platelets**

The primary function of **platelets** is to aid in the blood clotting process. This prevents blood loss. Normally they flow through the inactive blood. When they are activated, they get sticky and attach themselves to one another to block the flow of blood from damaged blood vessels. The **spleen** removes old platelets from the blood.



White blood cells only live one to three days, so the bone marrow is always creating new white blood cells.



Diseased bone marrow can produce abnormal red blood cells.



Platelets' lifespan is about nine to ten days.



#### Application

Complete the sentences.

bone marrow two Gas exchange

Red blood cells are produced in the <u>bone</u>

<u>marrow</u>. There are <u>two</u> major blood vessels in the circulation system.

Gas exchange is the main function of red blood cells.

## The Circulatory System Poster

#### You will need

Poster board, markers, colored pens, decorative art supplies

#### Instructions

Design and create a poster that includes:

- 1. The heart.
- 2. Four rooms of the heart.
- 3. Arteries with oxygenated blood to the body.
- 4. Veins with deoxygenated blood back to heart.
- 5. Write a paragraph below your illustration to show the importance and function of the heart.

#### Lesson 15



#### Learning goals

Describe and explain the structure and function of the digestive system.

#### **Standard**

• Describe some characteristics, functions, and care of the organs of the digestive system of the human body.

#### Content

- The digestive system
- Taking care of the digestive system
- Other important organs in the digestive system



#### **Key Language**

**salivary glands.** Glands in the mouth that produce saliva.

**intestines.** Long tubes through which food travels from the stomach and out of the body.

**digestive system.** It includes the organs in the body that process food and turn it into energy.



#### Science and Technology

 Ask students to watch the video about how the digestive system.



 Students make a list of the main organs in the digestive system; in the order food goes through it.



#### **Complementary Activities**

#### Warm-up

• When introducing the topic, ask students to discuss what happens to the food that they eat.

#### **Learning and Application**

- Divide students into groups. Give each group some bread, soda, a plastic zipper bag, and
  one leg of a pantyhose. Break bread into pieces (teeth) and throw it in the bag (stomach).
  Add some soda (digestive juices). Have students squeeze and mix the bread and soda.
  Throw the mixture in the panty hose (intestines). Work the way through to the end where
  it is being worked out. Explain each step as if it were the digestive system.
- Have students imagine that they are food that is being eaten. Have them write a story
  of their travel through the digestive system. Include the organs and the functions of
  each in the story. Use pictures to make the story more enjoyable.
- Advanced students can think of ways to help the digestive system stay healthy. Make a poster with some of the tips.
- At the end of the lesson, ask: What is the digestive system? Which organs form part
  of the digestive system? Where does digestion start? How can we take care of our
  digestive system?



#### Lesson 16



#### Learning goals

Describe the structure of the excretory system and its operation.

#### Standard

• Describe some characteristics, functions, and care of the organs of the excretory system of the human body.

#### Content

- The function of the excretory system
- Parts of the excretory system: kidneys and blood vessels
- Other organs in the excretory system



#### **Key Language**

**nephron.** Unit of the kidney that filters the blood, and selectively reabsorbs substances.

excretory system. System that consists of organs which remove metabolic wastes and toxins from the body.

**bladder.** Bag-like organ inside the body, where urine is stored before it leaves the body.



#### Science and Technology

 Ask students to watch the video about kidney functions.



 Students have a group discussion about the fact that we only need one kidney to survive.



#### **Complementary Activities**

#### Warm-up

• When introducing the topic, ask students to talk about what they do with things they do not want or need anymore. Ask if any of the students know how their body gets rid of the things it does not need anymore.

#### **Learning and Application**

- Divide the class into five groups. Each group gets a different organ that helps with getting rid of waste (kidney, liver, skin, lungs, large intestine). Have students individually prepare an oral presentation on how the body gets rid of waste using the specific organ.
- In groups, the class plays "Name the Excretory System Part." The teacher hands out pictures of the organs to the students. Each student gets a chance to show their picture to the class. The first one to name the part and provide the function gets a mark. The group with the most points wins.
- Advanced students can do research on kidney transplants and kidney donation. Then, share the information with the rest of the class.
- At the end of the lesson, ask: What is the function of the excretory system? How does the kidney work? What are the two stages of filling the bladder?



### **Lesson 15** The Digestive System



We all like eating. But what happens to the food we eat? Our body digests the food and takes in the nutrients it needs for our daily activities.

What is your favorite food to eat?

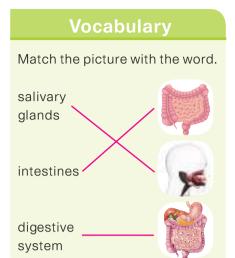
Number the pictures from 1 to 4 from your favorite to least favorite. O.A.













#### The Digestive System

The human digestive system consists of several organs. Digestion involves the breakdown of food into smaller pieces. The breakdown is necessary for food to be absorbed into the body.

There are the three stages in the digestion process:

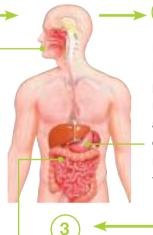
#### The Digestive System

The digestive system consists of the following organs:

- Mouth
- Teeth
- Salivary glands in the upper part
- Stomach
- Small and large intestines
- Rectum
- Liver
- Pancreas
- Gallbladder



The first stage starts with smell and sight of food. Then follows the mechanical breakdown of food by chewing, and the chemical digestion with saliva in the mouth.



Next, the digestion in the stomach takes place. The food is mixed with gastric acid for a couple of hours until the mixture passes down to the next stage.

The third stage is called the intestinal stage. This is where the food mixes with enzymes produced by the pancreas. Absorption of nutrients and separation of waste take place during this stage.

#### **Application**

- Name the three stages of the digestion process.
- Smell of food, chewing the food
- Digestion in the stomach
- Intestinal stage

#### Did you know?

Your stomach does not play the biggest role in digestion.





#### Mouth, Teeth and Salivary Glands

Physical and chemical digestion happens in the mouth.

The physical digestion starts with your teeth while you chew. Food is broken down into smaller pieces. Your tongue helps to move the food around in your mouth, so all the pieces can be chewed.



The teeth and tongue help with physical digestion.

Chemical digestion is when the chemicals in the mouth - enzymes produced by your salivary glands - mix with the food to help break it down. Saliva is needed so that the food can be pushed down the esophagus that connect the mouth with the stomach.



#### Stomach

The stomach is a J-shaped organ.

It plays a very big role in the digestive system, because it is where the food is stored while it is broken down. While the food is there, more enzymes help to break down the food. It is being mixed with acids, called gastric fluids.

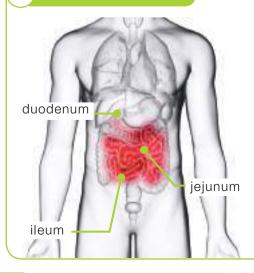
The stomach passes on a thick liquid called chyme.



Salivary glands help to push food down to the stomach.

#### 3

#### **Small Intestine**



The small intestine is composed of a duodenum, jejunum, and ileum. The first part works with fluids from the liver and pancreas to break the food down further. The second part of the small intestine is where the nutrients get absorbed from the intestine and into the body through the blood. Absorption occurs throughout the small intestine, but the most absorption happens in the jejunum.

#### 4

#### **Large Intestine**

The large intestine includes the cecum, appendix, colon, and the rectum. It is approximately 1.5m long.

It is the last stage in the digestive system. Any food that the body does not need or can't use is sent to the large intestine. It absorbs water from the leftover food and is sent to the lower colon and rectum.

#### Rectum

The final stop is the rectum. Here the remains of food and water are stored until later, when it leaves the body as waste. This waste is called

feces.

#### **Application**

 Look at the clues and complete the crossword.

#### Down

- 1. Food is stored until it leaves the body.
- 2. Drink enough of this liquid.
- 3. Tube where chyme is mixed with more liquids.

#### **Across**

- 4. We chew with them.
- 5. J-Shaped organ.

#### Did you know?

The longest section of your digestive tract is your small intestine and it is about 6.5m long.



#### **Critical Thinking**

What would happen if one of the organs of the digestive system was taken away?

We would not be able to eat and the food would not be digested.

## Taking Care of the Digestive System

Help your digestive system by doing the following:

- Drinking water
- Eating healthy
- Taking in enough high-fiber foods

		<sup>2</sup> <b>W</b>				
3 <b>i</b>		а				
n		t				
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#### Think about it...

What are some other organs in the digestive system?



Learning

#### Other Important Organs in the Digestive System

Liver, pancreas, and gallbladder.

#### Liver

It is the organ that processes all the chemicals in your body. Blood carries nutrients from the small intestine, and the liver decides what should happen to it.



#### **Pancreas**

This is located just behind your stomach and makes chemicals called enzymes, which help digest nutrients in your food. It makes insulin that helps control your blood sugar.



#### Gallbladder

This stores bile, a liquid that aids digestion, and makes it thicker and stronger before adding it to the small intestine.





#### **Game Time!**

Let's play a game of digestive system Monopoly.



#### You will need

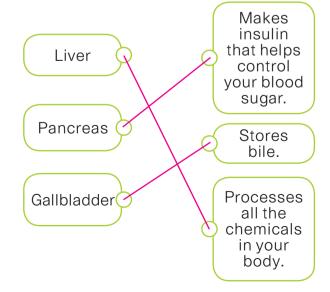
Poster board, colored markers, dice

#### Instructions

In groups of 6, design your own Monopoly board game. It should have all the organs that you can buy and some questions about the system to be answered.

#### Application

 Match the organ name to the correct function.



#### Lesson 16 The Excretory System





Everywhere in life, we are throwing away waste. Our bodies do the same thing with unwanted products and toxins.

Put an X next to the picture if you think it is waste.







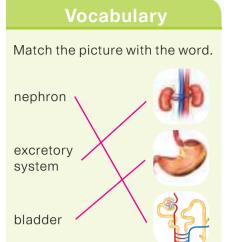








It moves wastes and toxins from the body.



Think about it. What is the function of the excretory system?



Learning

#### The Function of the **Excretory System**

#### The **excretory system**

consists of organs that remove metabolic wastes and toxins from the body. The process the body uses to get rid of this waste is called homeostasis. The kidney, liver, and large intestine perform most of the filtration duties. Solid waste passes out through the colon while gaseous waste exits the body through the lungs. Excess liquid leaves the body through the **bladder** and the skin.

#### **Parts of the Excretory System**

The excretory system consists of three organs.



The liver is an excretory organ.



Waste leaves the body through the skin when you sweat.



The kidneys, urethra and urinary bladder are involved with the creation and expulsion of urine. Through these organs, a lot of waste leaves the body.



Fill in the correct word from the box:

three

Homeostasis

liquid

Homeostasis is the process the body uses to get rid of waste. Excess liquid leaves the

body through the skin and bladder. There are <u>three</u> main organs in the excretory system.

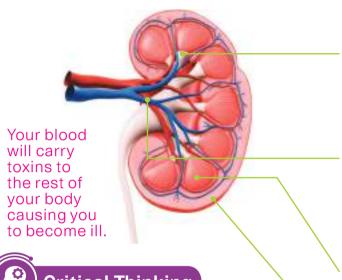


#### **Kidneys**

Think about it... What are the parts of the excretory system?



All humans have two kidneys, located on each side of the spine. Each kidney is divided into three parts; renal cortex, medulla, and pelvis.



**Nephrons** are found in the kidney and are responsible for the filtration of blood and regulation of chemicals.

The pelvis is the point where the blood enters and exits the kidney. It is also where the urine exits from the ureters and empties into the bladder. It is the point where the kidney connects to the rest of the body.

The medulla is the inner part of the kidney. This is where the blood is filtered, and the water and ion levels are regulated.

The renal cortex is the outer part of the kidney. It is made of blood vessels and connected to nephrons.

# **Critical Thinking**

What do you think would happen if you didn't have kidneys to help you with the filtering process?

#### **Application**

- Answer the following questions.
- 1. How many kidneys does a human have?

#### Two

2. What are the nephrons responsible for?

#### Filtering blood and regulating chemicals

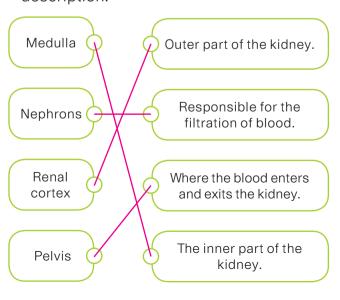
3. Where does blood enter and exit the kidney?

#### Pelvis

4. Where can you find the nephrons?

#### Renal cortex

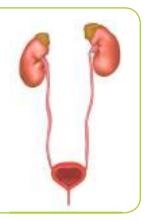
 Match the correct part of the kidney to the description.



#### The Blood Vessels

#### Ureter

The ureter is a muscular tube whose sole function is to carry urine from the kidneys to the bladder. The ureter is connected to the renal pelvis of the kidney.



#### Urethra

The urethra is a tube that starts from the urinary bladder and expels urine to the outside. The opening of the urethra is guarded by a sphincter that is automatically controlled.



#### **Urinary Bladder**

The urinary bladder is a sac-like structure with muscular walls that stores the urine until it is expelled from the body. The bladder receives urine through two ureters that enter through openings. Urine exits the bladder through the urethra.

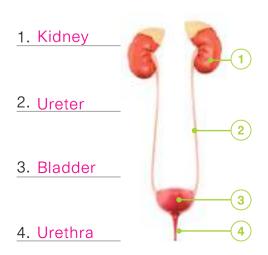


#### The Filling of the Bladder Has Two Stages

- 1. Resting/Filling stage: When the urine is transported from the kidneys. The opening is guarded by a muscle that prevents urine from re-entering the ureter and allows the bladder to store more urine.
- 2. Voiding stage: This is when the urine is expelled. Internal and external muscles relax, and urine can flow and exit the body.

#### **Application**

• Give the correct name of the numbered organ.



Write T for true and F for false.

The ureter only has one function and it is to carry the urine from the kidney to the bladder.

T

There are 4 stages in filling the bladder.

F

The urinary bladder is a sac-like structure.

T

Urine exits the bladder through the urethra.

T

A sphincter is not automatically controlled.



#### Other Organs in the Excretory System

There are also other ways our body excretes waste.

Liver: The liver is the main detoxifying organ of the body, especially for nitrogenous waste. The cells of the liver play host to the biochemical processes that creates ammonia from amino acids.

**Skin:** The skin is a secondary excretory organ since sweat glands in the dermis can remove salts and some excess water.





Other
Organs for
Excretion





#### Did you know?

The liver is the second biggest organ next to the skin.



**Large Intestine:** The large intestine is responsible for the removal of feces from the body.

Lungs: All humans and animals must expel carbon dioxide. It is created in the cells of the body, as they go through aerobic respiration. This waste product is removed from the cells and transferred to the bloodstream. When the blood reaches the lungs, it is exchanged for oxygen and released into the air.

#### Be a Scientist

#### **Kidney Functions**

#### You will need

Coffee filter, funnel, sand, water, 2 clear disposable cups, 1 plastic tube - 10cm long

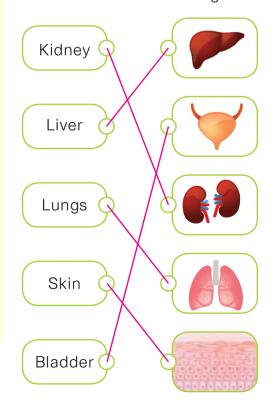
#### Steps

- 1. Join the funnel with the tube.
- 2. Measure four spoons of sand and a half a glass of water.
- 3. In one of the glasses, mix the sand and water.
- 4. Fold the filter paper in 4. Place it in the funnel.
- 5. At the end of the tube, place the empty glass.
- 6. Pour the water mixed with sand, so that it goes through the filter paper.
- 7. Observation: What happens with the water after it comes out through the filter paper? Write down your observation.

The water comes out clean without sand. The kidneys works the same way by filtering out waste.

#### Application

 Match the correct picture to the correct excretion organ:



#### Lesson 17



#### Learning goals

- Describe the reproductive organs of men and women.
- Practice hygiene measures of the genital organs.

#### **Standard**

• Describe some characteristics, functions, and care of the organs of the reproductive system of the human body.

#### Content

- The reproductive system
- Female reproduction system
- Male reproductive system
- Care and hygiene of the reproductive system



#### **Key Language**

**fallopian tubes.** Female structures that transport the ova from the ovary to the uterus.

**prostate gland.** Male reproductive organ; main function is to secrete prostate fluid.

**pelvic system.** Lower part of the trunk of the body between the abdomen and the thighs.



#### Science and Technology

 Ask students to watch the video about the male and female reproductive system.



 Students draw a picture of the brain and explain its role in the reproductive system.



#### **Complementary Activities**

#### Warm-up

• When introducing the topic, ask students to discuss where babies come from and how humans reproduce.

#### **Learning and Application**

- In pairs, give students pictures of the female and male reproductive system. Each
  pair gets a different picture. Have students tape their picture in the correct place on
  the board to form a complete system at the end. When pasting it to the board, they
  need to name and explain the part of the reproductive system.
- Students make a Venn diagram of the male and female reproductive parts. Then, they summarize the functions in their notebooks.
- Advanced students can look for five living things that reproduce sexually and five living things that reproduce asexually and state the differences.
- At the end of the lesson, ask: What is the reproductive system? In which two ways can living organisms reproduce themselves? Can you name the female reproductive organs and the function of each? Explain the male reproductive organs and functions.



#### Lesson 18



#### Learning goals

Know the structure and function of the sense organs.

#### Standard

Identify the characteristics of the sense organs, their functions, and basic care.

#### Content

- The five senses
- Touch, smell, sight, hearing, and taste
- Care and hygiene of the sense organs



#### Key Language

**texture.** The way something feels when you touch it.

**taste buds.** Group of cells found on the tongue that allow different tastes to be recognized.

**sound waves.** Waves of energy that we hear as sound.



#### Science and Technology

 Ask students to watch the video about the five senses.



Students play "Senses Charades."
 They act out different actions for which we use our senses. Rest of the students guess.



#### **Complementary Activities**

#### Warm-up

• When introducing the topic, ask students to talk about how they experience the environment around them. Have students sit quietly with their eyes closed and ask them what they hear, smell, feel, taste and when opening their eyes, what they see.

#### **Learning and Application**

- Pair students together and have them collect pictures of the five senses; the organs
  we use and things we can taste, smell, see etc. Hand out a paper and have students
  divide the paper into five parts. Make a collage with the pictures they collected.
  Then, they can write a short poem for the senses using the pictures of the collage.
- Divide the class into five groups. Each group gets a sense. Design a big poster with tips on how to keep your sense organs safe and healthy. Insert the do's and don'ts.
- Advanced students can choose either the eyes or ears. They research why people are blind or deaf. How do these people still live normally without this sense? Then, they summarize their findings in a mind-map format.
- At the end of the lesson, ask: What are the five senses? Which organs do we use for each sense? How do these organs function and help us experience the world around us?



#### **Lesson 17** The Reproductive System





We are all different. Boys differ from girls.

Boys and girls have certain things in common but also have a lot of qualities that make them different.

Name one quality that makes you proud to be a boy/girl. Provide a reason for your choice.

O.A.			





#### The Reproductive System

Almost everyone that grows up has wondered where babies come from. Reproduction means the action or process of making a copy of something. Human reproduction is a natural process of making new humans. Reproduction is necessary to replace the old humans that passed away, with new, young ones.

Living things reproduce in either one of two ways:

> **Sexual Reproduction** Involves two individuals of the same species, usually male and female.

**Asexual Reproduction** Without the involvement of another, usually found in single cell organisms and some plants.

**Application** 

Reproduction

Choose the correct word from the box.

1. Generally, means the action of making a copy of something.

Asexual reproduction Sexual reproduction

Did you know? During pregnancy, the uterus grows from an orange size to

a watermelon size.

Reproduction

2. Copying a thing without the involvement of another.

Asexual reproduction

3. Involves two individuals of the same species.

Sexual reproduction

# Think about it... What are the female reproduction parts?



#### **Female Reproduction System**

As boys and girls grow up, their differences become more visible. The female is the one that carries the baby until it is ready to be born. The female reproductive system consists of the ovaries, **fallopian tubes**, uterus, vagina, cervix and the vulva.

Fallopian tubes (Egg tubes): The vessel through which the egg travels to the uterus. Each ovary connects to the uterus by a fallopian tube.

Uterus (womb): It is a bag, pear shaped, organ held in position by muscles and ligaments. It has a very soft wall which holds the fertilized egg. This is where the baby develops for nine months.

Cervix: The cervix is a muscle in ring form that is at the lower third portion of the uterus. It forms a barrier between the uterus and the "V". The baby is kept in place by the cervix, which expands during birth so the baby can pass.

Ovaries: Each woman is born with two ovaries that produce hundreds of ova. These are the egg cells. The undeveloped egg cells are stored in the body and one egg a month is being released. Unused eggs dissolve and pass out during menstruation.

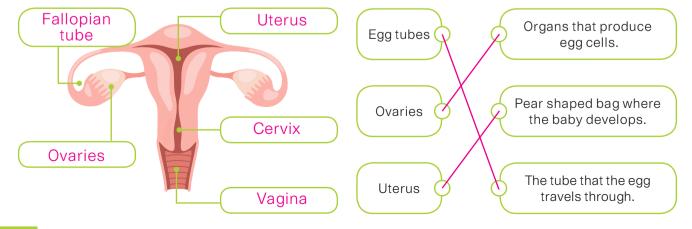
vagina: It is an elastic, muscular canal that connects the cervix to the outside of the woman's body. It is the tube that receives the male organ during intercourse.

During menstruation the unused egg (blood) exits the body through this canal.

#### Application

Name the correct parts:

Match the correct organ to the description.



# Think about it...

What does the male reproductive system look like?



It includes the testes, prostate glands, sperm ducts. urethra. and penis.

#### Male Reproductive System

The male reproductive system consists of organs located outside of the body as well as inside the body around the **pelvic system**. The primary function of the male is to provide sperm to fertilize the female ovum. It consists of the following organs: testes, prostate glands, sperm ducts, urethra and penis.

Sperm duct: During intercourse, sperm cells that have been released pass through the sperm duct.

**Testes:** There are two testes. They are held in place by the scrotum. The scrotum is a bag of tough skin. The main function of the testes are to produce male cells, sperm, and produce male reproductive hormones. Sperm cells look a lot like tadpoles.

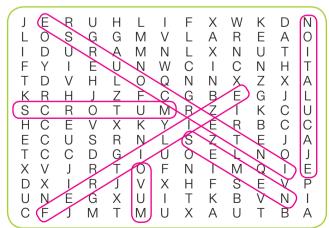
**Urethra:** The tube inside the male organ that carries urine or semen. It continues from the sperm duct.

Prostate gland: The function of the **prostate** gland is to create prostate fluid, one of the components of semen. The combination of sperm and the fluid is called semen.

Penis: It is an external organ. The main function is to let the urine out and to pass semen into the female during intercourse.

#### **Application**

 Find and circle the words in the word search.



intercourse, scrotum, semen, ovum, fertilize, ejaculation

 Write the function of the following male reproductive system organs.

#### Testes:

Produce the male productive cells.

#### Penis:

Urine exits the body, organ that releases the semen into the female.

#### Prostate gland:

Create fluid to mix with the sperm cells.

#### Sperm duct:

Transport tube for semen.

# Care and Hygiene of the Reproductive System

Did you know?

The reproductive system contains the largest and smallest human cells.



It is very important to take care of our bodies. Follow these simple steps and keep your body clean.



Take a shower or bath every day and clean your genitals.

some clean underwear every day.







Avoid rough games where your genitals can get hurt.



Put on

If there were no such thing as reproduction, what would happen? Discuss your ideas with your friends.

There wouldn't be any living beings on Earth. Earth as we know it, wouldn't exist.

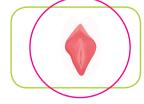
#### Application

 All the pictures below are organs from the reproductive system. Circle all the organs that are part of the female reproductive system.













# Hands on!

#### Design a Poster

#### You will need

Poster board, color markers, magazine cutouts, glue, decorating supplies

Design a poster to inform people about the importance of hygiene in the reproductive system. Provide some tips on how to stay healthy.
Use the information from the lesson and think of more tips. Write short phrases

think of more tips. Write short phrases (not long sentences) and include pictures.

Remember, a poster should be colorful to attract people's attention.
After you are done, present your poster

to the class.

#### Lesson 18 The Senses



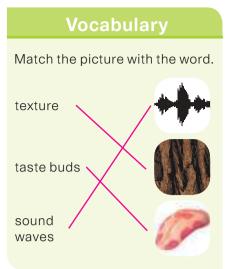


Every day we see, hear, taste, touch, and smell different things. Some of these things are very familiar, others are new that we experience for the first time.

Think of the moment you just woke up this morning.

Write down what you experienced this morning. What did you see, hear, taste, touch, and smell?

O.A.



### Learning

#### The Five Senses

Humans have five senses: touch, smell, sight, hearing, and taste. The sensing organs for each sense, send information to the brain to help us understand the world around us. The

Think about it... How do we observe different things in our daily life?



By using our senses.

five senses help us to observe different things, like the taste of food or the smell of flowers. Not all of us have five senses. Some people become blind and lose their sense of sight, and others may not hear.

#### Learning

The skin responds to shape, texture, temperature, and pressure. The skin consists The skin is the out of three organ of touch. different layers. It is responsible for collecting different sensations and. Touch transmitting them to the brain. The presence and Special receptor cells location of certain in the layers can detect receptors make tactile sensations and the skin more relay signals to the brain. sensitive.

#### **Application**

 Close your eyes. Feel around you. Think of one thing that you just felt. Draw a picture of this object.

O.A.

#### **Sight**

We use our eyes for our sense of sight. The eyes help us to see light, shapes, colors, sizes, and different objects.

The eyes are in the orbit of the skull. They are protected by bone and fat.

The cornea allows the light to enter the eye and curves it to direct it through the pupil.

The colorful part of the eye is called the iris.

# Think about it... How do the eyes let us see?

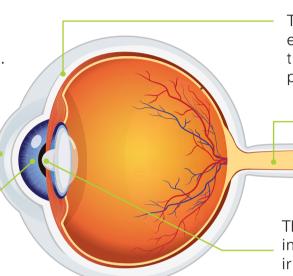


The corneas allow light to enter the eye and then curves that light to direct it through the pupils.

The white part of the eye, the sclera, protects the cornea, iris, and pupil.

The optic nerve takes information from the eye to the brain.

The pupil is an opening in the colored disk of the iris. The eye has a clear covering called the lens.



#### **Application**

 Write down the name of the sense: Touch or Sight.



Shape of an apple:

Touch and sight

Color of an apple:

Sight

Texture of the apple:

Touch

Temperature of the apple:

Touch

Size of an apple:

Touch and sight

How hard is the apple?

Touch



#### **Critical Thinking**

If you had to choose, which one of your senses would you prefer to lose? How would this affect your life? O.A.

• Use your sense of sight and spot the eight differences.





#### **Smell**

We use our nose for the sense of smell. It allows us to perceive different aromas.

The nose consists of two nostrils where air enters the body and receives the smells.

The information is sent to the brain through the olfactory nerves.

#### **Taste**

We use our tongue to taste. Our tongue is covered with **taste buds**, which helps us to recognize tastes. There are four different areas on the tongue where each taste is mainly perceived.

**Sour:** These are at the sides of your tongue at the back. They are activated with sour—tastes, like when you eat a lemon.

Salty: These taste buds are on the sides of the tongue in front just behind the sweet taste buds. This is where you taste anything salty like fries.

Sweet: These taste buds are found on the tip of your tongue. They taste everything that is sweet.



Bitter: These are in the middle at the back of your tongue. Anything that tastes bitter, activates these taste buds.

#### Think about it...

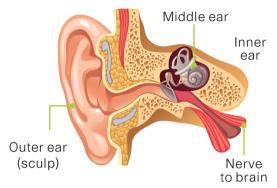
What are the rest of the organs we use for our senses?



#### Hearing

Smell-nose, hearingears, and taste-tongue.

The ears are the organs that we use to hear. Sound reaches the ears as **sound waves**. The ear has three parts.



Music, laughter, dogs, and everything else makes a sound. With our ears, we can distinguish different sounds and where they come from.

## Application

• Complete the table.

Name of organ	Draw a picture	Function	
Eyes	Picture of eyes.	To see things.	
Ears	Picture of ears.	To hear things.	
Nose	Picture of nose.	To smell things.	
Tongue	Picture of tongue.	To taste things.	

# **Did you know...**All babies are colorblind when they are born.



#### **Care and Hygiene of the Sense Organs**

It is important that we take care of our sense organs because we depend on them.

**Skin:** Eat fruits and vegetables. Take a bath daily. Avoid too much sunlight.



eyes: Eat yellow or orange fruits and vegetables.
Protect your eyes from too much sunlight. Avoid reading in a moving car or in half dark rooms.

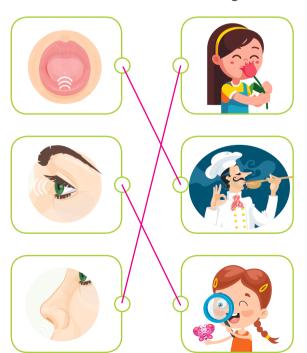
Ears: Use a soft cloth to clean your ears after bathing. Never poke any sharp object in your ears. Avoid listening to very loud noises.

**Tongue:** Gently brush your tongue to remove any tiny bits of food trapped between its folds. Avoid food with a very hot temperature.

Nose: Use a soft cloth or cotton balls to clean your nose. Avoid blowing out your nose too hard. When blowing your nose, do it one nostril at a time.



Match the action with the organ.





#### Spin the Wheel!

Design your own "Spin the Wheel" card. On it should be the five sense: sight, touch, hearing, taste, and smell.



Divide into groups of 5. Take turns to spin the wheel.

According to where it stops, you should say something that you experience with that specific sense.

Example: If it lands on taste, you should say chocolate: something sweet. If you land on touch, you can say "hot pot."

Keep track of your points. The player with the most points and the quickest responses is the winner.



#### Learning goals

 Recognize the basic needs of human beings from the individual, social, and cultural point of view, promoting behavior that satisfy them.

#### **Standard**

• Describe the importance of physical exercise and the consumption of nutritious food for the proper functioning of the body.

#### Content

- Maslow's hierarchy of needs
- Most basic needs
- Safety and security needs
- Love and belonging needs
- Relationship needs with other living beings



# Key Language

**protection.** The act of keeping someone or something safe from injury, damage, or loss.

**relationship.** A close connection between two people.

**breathe.** To move air into and out of the lungs.



# Science and Technology

 Ask students to watch the video about the needs of humans according to Maslow.



 Students discuss how a leader would help people to complete the needs of a human being.



# **Complementary Activities**

#### Warm-up

When introducing the topic, ask students to discuss their everyday needs and wants.

- Have students build their own Maslow block. They can add their own personal experiences and needs. For example, if they have a place to stay, write the address. If they had breakfast write down what they had. If they are feeling safe, say why. If they feel loved, say how they feel loved. Do this for each level.
- Have students write a story about why they would say it is important to have relationships with other living beings. Provide an example, such as how their parents take care of them when they are sick, or how they feel when they get home and the dog is happy to see them, or when something happened and they can share it with a friend, etc.
- Advanced students can think of ways to ensure healthy relationships with others and complete the need of love and acceptance.
- At the end of the lesson, ask: What are the most basic needs of a human? Why are security and safety important? How do relationships with other people help us?





#### Learning goals

- Identify and classify the most frequent diseases in the community according to their causes and transmission.
- State preventive measures for the most frequent diseases in the community.

#### **Standard**

• Describe the importance of physical exercise and the consumption of nutritious food for the proper functioning of the body.

#### Content

Diseases

- Contagion
- Preventive Measures



## **Key Language**

**hygiene.** Any practice or activity that you do to keep yourself healthy and clean.

**runny nose.** Mucus being discharged out of the nose. It can be caused by colder outdoor temperatures, or by the cold, flu, or allergies.

**medicine.** Any substance or substances used in treating disease or illness



# **Science and Technology**

 Ask students to watch the video about ten habits of healthy people.



 Students set up a schedule for one day to ensure that a person is healthy.



# **Complementary Activities**

#### Warm-up

• When introducing the topic, ask students how they feel when they are sick. Why do they feel this way?

- Students draw a table with the following headings: Disease Name, How it Spreads, Spread Prevention. Provide students with a list of diseases and have them complete the table.
- Have class play "Match." Working in pairs, one student writes a word related to disease prevention or healthy habits and their partner draws a matching picture.
   All the words get thrown into a box and gets drawn by the teacher. The pair with matching picture to the word has to shout "Match!"
- Advanced students can research the difference between good and bad bacteria.
   Then, they write a paragraph on the use and the benefits of good bacteria.
- At the end of the lesson, ask: What is a disease? How do diseases spread? What does the word contagious mean? How can we prevent the spread of diseases?



# Lesson 19 Needs of the Human Being



Warm-up

Basic needs is a term we use to define the absolute minimum resources are necessary for our long-term wellbeing.

Answer the following two questions after brainstorming the concept with your class friends:

1. What do living things need to stay alive?

O.A.

2. Where do they get the things they need to stay alive?

Match the picture with the word. protection relationship breathe

Vocabulary

Think about it... What are our basic needs?

O.A.

Learning

# Maslow's Hierarchy of Needs

Around the world, people go about doing the same things in very different ways. Although the behaviors of races and cultures are different, the basic needs we all have are similar.

Air. food. water, sleep, and shelter.



#### **Application**

 Read the description and connect the correct description with the correct level.

Safety and security - a safe home, safe body, safe workplace, enough money, no war



Physiological needs - air, food, water, sleep, shelter



Esteem - respect,



confidence, self-belief



Self-actualization - to become the best you can be



Love and belonging friends and relationships





b









# **Application**

 Needs are things that are essential and necessary in life. Wants are things we don't need but want to have. Write an N for need or a W for want next to each picture.



Can you survive on water alone?

No, we also need food, air, shelter, and sleep.

















Learning

#### **Most Basic Needs**

Think about it...
What are the most important human needs?



The first and most basic of all needs are those to do with physical survival. This is the need for food, drink, shelter, sleep and clean air. If a person cannot satisfy this basic survival need, it dominates their interest and concern.

A person who is cold, sick, or hungry will not be very interested in socializing, clean air.

The basic needs are food, water, shelter, sleep, and clean air.

Food	Water	Shelter	Sleep	Clean Air
The body	A lot of	We require	6-9 hours of	Oxygen is
needs calories	hydration	protection	sleep every 24	possibly our
and a variety	allows for the	from the hot	hours allows the	most basic
of nutrients	processes of	sun, freezing	brain to process	human need.
including	the body to	temperatures,	new knowledge	People can begin
protein, fat, and	happen. Without	wind, and rain.	and deal with	to experience
carbohydrates	water, the body	Without shelter,	emotional	brain damage
every day	cannot process	our skin and	information.	after as few as
to grow and	food or remove	organs would be		five minutes
function.	waste.	damaged.		without oxygen.

A right that belongs to every person regardless of race, gender, nationality, sexuality, religion, language, ethnic origin, or any other status.

#### Think about it... What are human rights?



# **Application**

 Use the words in the box to complete the sentences.

shelters sleep food water oxygen

From the Earth we get resources, like food, to assist us to fight hunger. But nature also give us <u>water</u> for hydration and <u>oxygen</u> to breathe. Natural products, like wood, can build shelters , and the Sun sets to make it dark enough to sleep

## Learning

#### Safety and **Security Needs**

- The need to be free of fear.
- The need to be secure in the environment (stability).
- The need for order and routine.
- Financial security.

#### **Application**

 Can you name the type of security shown in the pictures? Choose between physical, work or financial.



Financial and physical



Work





Work

Physical

Work

# **Love and Belonging Needs**

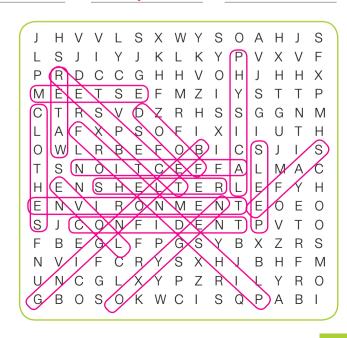
- Friendship
- Family time
- Social activities with others
- Romantic relationships
- Working in learning groups

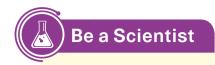
# **Application**

 Can you find the following 17 words in this word search?

Affection Physical Love Confident Clothes Esteem Water Belonging Friendship Safe Oxygen

Environment Shelter Food Respect Sleep





# How Much Air Can Your Lungs Hold?

#### You will need

- · Clean plastic tubing
- A large plastic bottle
- Water
- Large water basin or bucket to fill with at least 10 cm of water

## **Steps**

- 1. Make sure the plastic tubing is clean.
- 2. Put about 10 cm of water into your bucket/basin.
- 3. Fill the plastic bottle right to the top with water.
- 4. Put your hand over the top of the bottle to stop water escaping when you turn it upside down.
- 5. Turn the bottle upside down. Place the top of the bottle under the water in the sink before removing your hand.
- 6. Push one end of the plastic tube into the bottle while it is under the water.
- 7. Put the other end of the tube into your mouth and **breathe** out as much air as you can through the tube.
- 8. Measure the volume of air your lungs had by looking at what happens in the bottle.



#### Did you know? You can go longer without food than without sleep.



# **Relationship Needs with Other Living Beings**

A human being needs to feel like part of a group no matter where they live or what race or gender they are. This is the need for acceptance – to feel loved and accepted. An emotionally healthy person is responsible, makes constructive decisions and effectively participates in his/her community.

# Application

Mark a ✓ in the block next to the statement that you agree with. O.A.

	Always	Sometimes	Never
I understand what needs I have to meet to stay alive.			
I value healthy <b>relationships</b> with my family and my friends because I know it helps me to feel secure.			
I show love to my family and friends.			

# Warm-up

# **Disease Transmission and Preventive Measures**



Sometimes we do not feel to well. We have a headache, sore tummy, runny nose and feel tired. If we show these symptoms, we are usually sick and need to go to the doctor. Look at the pictures below. Write what you think is happening in each of the pictures?









# **Application**

- Complete the following sentences with the word "should" or "shouldn't."
- 1. She has the flu. She <u>should</u> stay at home.
- 2. He has a backache. He <u>shouldn't</u> carry heavy things.
- 3. She has a headache. She <u>should</u> take **medicine**.
- 4. Steve has a stomachache. He

  should drink lemon and mint tea.
- 5. You have a **runny nose**. You <a href="mailto:should">should</a> blow your nose.
- Angela has dirty hands. She <u>should</u> wash her hands.
- 7. My brother has a toothache.

  He shouldn't eat candy.
- 8. Carol has a sore throat. She <u>should</u> go to the doctor.

# Learning

Think about it... What should we do when we are sick?



Go to the doctor, take medicine, rest, stay at home, etc.

#### **Diseases**

Diseases come into your body and affect the way your body functions. Each medical condition shows specific symptoms and needs specific treatment. In subtropical areas like Honduras where it is hot and it rains a lot, diseases spread faster.

Infectious diseases are commonly transmitted through direct person-to-person contact. Transmission occurs when an infected person touches or exchanges bodily fluids with someone else. This can happen before an infected person is aware of the illness.

Let's read a poem about how to stay healthy.



#### **Being healthy**

Mom says I have to brush my teeth. In the morning and at night. They look and taste much better. But I hate it when she's right.

Dad says I have to take a bath And wash my body well. I do feel nice and clean and fresh. But now he's right as well!

My brother says I have to wash My hands to keep them clean. He's right - my fingers feel so good Without dirt in between.

My sister says I have to eat Some vegetables each day. She's right, I have more energy To run and walk and play.

I feel more healthy and I've got Much better teeth and skin. Don't tell them that I think they're right I hate it when they win!

-Gillian Craig

# **Application**

- Here are eight pictures and eight types of habits we have to know and practice in our lives. Write the correct letter in the box of each picture.
  - A. Oral hygiene
  - B. Bathing
  - C. Hair care
  - D. Foot hygiene
  - E. Hand hygiene
- F. Toilet hygiene
- G. Hygiene with our belongings
- H. Coughing and sneezing hygiene

#### **Application**

- Now answer the following questions:
- 1. Name a disease she might get if her hands are dirty and she touches the food she eats.

#### Food poisoning or a stomach bug.

2. Name a disease she might get if she doesn't eat enough vegetables.

Her immune system will be struggling, so first the flu but then much worse diseases.

3. Could she also be the cause for others getting diseases because her own **hygiene** is not good?

Yes, bugs could transfer from her own hands to other people when she touches them.

4. What else could she do to keep her body healthy?

Get enough sleep.



# **Critical Thinking**

What is the worst disease Honduras has ever had to fight?

Dengue fever in 2019 and Coronavirus COVID-19 in 2020.

















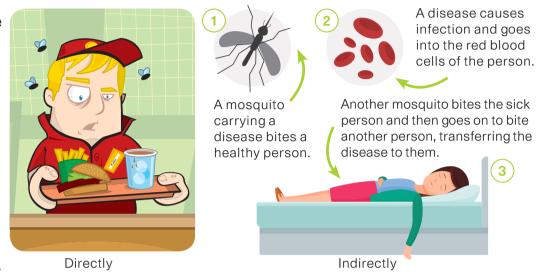
# **Contagion**

Contagion is the spreading of disease from one person or organism to another by close contact. Diseases are transmitted directly or indirectly.

A fly picks up the disease carrier from feces of an animal.

The fly sits on your food and transfers the carrier to the food.

You eat the contaminated food and get sick.



#### Did you know?

Many common disease-causing bacteria are actually harmless bacteria that have been infected with a virus.



## **Application**

- Answer the questions by using the pictures for ideas.
- 1. Where are some of the places in your school that may have the most germs? Name three.

# Lunchboxes and school bags

## Playground equipment

#### Doors and door knobs

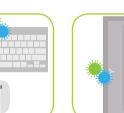
2. What other common places may have a lot of germs? Name three.



School supplies

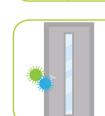
Desks











#### **Preventive Measures**

Think about it... How can we prevent getting sick?



The most frequent diseases in Honduras are Chagas disease, dengue fever, malaria, cholera and influenza. Below is a list of preventive ideas for each of these diseases.

Use mosquito nets. practice good hygiene, drink clean water, etc.

#### **Application**

 Connect the disease with the best idea to prevent it.



#### Advertisement

Hands on!

#### You will need

- Information about mosquito nets
- Paper
- Pictures
- Crafts, pens, glue, scissors

#### Instructions

You are the marketing manager of your company. Your company just discovered a mosquito net that 100% protects from bites.

Your job is to make an advertisement for the local newspaper about this net. Your target is to sell 10,000 nets. Your ad should be colorful and it must contain necessary information, such as:

- Why must someone buy a net?
- What makes this net different?
- Where can they buy it?
- How much does it cost?

е

р

#### е Complete the crossword puzzle with the clues below. Х е Down 1. A daily activity to keep your <sup>2</sup>**s** r body healthy. Exercise Т С 2. We need 7-10 hours of this per day. Sleep i. g е n е S е Across 3. Things we do to stay clean

and prevent diseases. Hygiene

**Application** 



#### Learning goals

- Identify risky conditions to avoid situations that could trigger an accident.
- Visualize the consequences of the most common accidents.
- Emphasize the need for prevention.

#### **Standard**

 Recognize the risks, prevention measures, and the way to act in the event of disasters and accidents.

#### Content

- Who to call in an emergency
- Most common accidents

- Accident prevention and first aid
- The risk of using fireworks



#### Key Language

**first aid.** Help given to a sick or injured person until full medical treatment is available.

**hurricane.** Is a severe tropical storm with high winds and heavy rain.

**explosion.** A violent shattering or the blowing apart of something.



## Science and Technology

 Ask students to watch the video about accident prevention.



 Students must choose two scenarios from the video and explain the treatment and prevention for each.



# **Complementary Activities**

#### Warm-up

 When introducing the topic, ask students if they ever had an accident and what first aid treatment they received or whether they ever had to help someone how needed first aid.

- Pair students together and give each pair an accident scenario. Have them role-play how they would apply first aid to the patient in need.
- Divide students into groups of four and ask them to bring cutting material (wood, plastic, cardboard) from home together with pictures or actual first aid kit contents. Students have to build their own first aid box and fill it with the items they brought.
- Advanced students can research the difference between first aid and professional emergency personnel and illustrate the differences in a Venn diagram.
- At the end of the lesson, ask: What is the definition of first aid? Why is it necessary for every person to know basic first aid? Why is it important to always have a first aid kit at hand? Who do we call in case of an emergency?





#### Learning goals

- Identify foods consumed in the community and classify them according to nutrients, origin and preparation.
- Relate the nutritional value of food with its composition and freshness.
- Explain the functions of different types of nutrients in their body.
- Understand the positive effect of good nutrition on the mother during pregnancy and lactation of the baby.

#### **Standard**

• Classify foods by their characteristics and their nutritional function.

#### Content

- Balanced diet
- The processing of food
- Nutrition and pregnancy
- Problems with nutrition



# **Key Language**

**carbohydrates.** Sugars and starches; one of three main ways the body gets energy or calories.

**nutritional.** Process of providing or obtaining food necessary for health and growth.

**obesity.** State of being overweight.



## Science and Technology

 Ask students to watch the video about the food pyramid.



 Have students draw their own food pyramid.



# **Complementary Activities**

#### Warm-up

• When introducing the topic, ask students to name a few foods they like to eat and say which of them have a high nutrient content and why.

- In pairs, students bring fresh ingredients from home and prepare a healthy lunch. Then, using the food pyramid they explain the categories used in their lunch.
- Have students make a collage with four columns with examples of fresh foods, processed foods, and foods with a high and low nutritious value. Create a one-day menu using the food examples from their collage. The menu should be healthy and represent a balanced diet.
- Advanced students can add two more columns to their collage stating the advantages and disadvantages of fresh and processed foods.
- At the end of the lesson, ask: Why is a balanced diet important? What causes obesity? What is the healthiest way to consume food? What are the differences between undernutrition and malnutrition?



# Warm-up

# **Accidents, First Aid, and Disaster Prevention**



An accident is an unplanned event that sometimes has undesirable consequences.

1. Tell about a time when you had an accident.

O.A.

2. Did you receive any first aid?

O.A.

3. What have you done since then to prevent the same accident from happening?

O.A.



Learning

#### Who to Call in an Emergency

In case of an accident, it is important to remain calm, make sure you are safe and call for help. This table has the most important emergency numbers in Honduras.

# **Application**

- Write the letters in the circles to match each prevention with its correct picture.
- a. Don't push or trip. Walk slowly down stairs.
- b. Pick up toys and things lying on the floor.
- c. Don't play with fire. Be careful around stoves and boiling water.
- d. Use sharp objects with care.
- e. Breathe well don't put plastic bags around your head.
- f. Do not drink or eat things you don't know.

## Vocabulary



Think about it...
Who should we call in case of emergency?

Depending on the emergency we should call 234-5944, 911, 195, 198, or 797.

In case of an	General Emergencies	234-5944
emergency call:	Police	911
Put these	Ambulance	195
numbers up where you	Fire	198
can always see them.	Honduran Red Cross	797













#### **Most Common Accidents**



# SCHOOL



#### At Home

There are lots of things to be careful of around our homes:

- Medicine
- Insecticides
- Disinfectants
- Electrical cords/plugs
- Stove
- Sharp objects
- Stairs and windows

#### At School

Schools are busy places with a lot of people on the premises. Your school must always have a first aid kit that is well stocked. Be careful with things like scissors and sharp pencils. Don't trip or push friends around. Walk carefully rather than run.

#### In the Community

Most accidents in our communities happen around traffic. Cars and pedestrians sharing the road need to respect traffic signs and each other. Always walk on the street accompanied by an adult, and do not talk to strangers.

#### Think about it...

How can we help someone that got hurt?



We can give them first aid, we can clean the wound, we can put pressure on it, etc.

# Application

# **Accident Prevention and First Aid**

 Complete the sentences with the words from the box.

save care injured



Is there something you can always carry with you to prevent an accident?

First aid is emergency <u>care</u> given immediately to an <u>injured</u> person. The purpose

of first aid is to minimize injury and <u>save</u> lives.

 Look at the pictures below of someone who cut their arm. The pictures are in random order. Number them from 1 to 5 to show the steps you would follow if you had to perform first aid because a friend of yours got hurt.











#### Did you know?

First aid kits are a legal requirement. Every establishment should have one.



Learning

#### What You Need to Know

Accidents are unpredictable, especially if we do risky things and don't consider our own safety or the safety of the people around us. Here are five tips to assist you in case of an emergency:

#### If someone has a bad bleed:



Press on it. Try not to move too much.

#### If someone has a broken bone:



Keep it still and support it.

#### If someone has an allergic reaction:



Sit them down, make them comfortable and let them take their medication.

#### If someone is having an asthma attack:



Sit them down and assist them to use their inhaler.

#### If someone is upset:



Stay calm and listen, get a trusted adult involved.

# **Application**

 Can you name the items in the first aid kit? Write the correct number next to the name.



3	Adhesive tape			
6	Adhesive bandage			
7	Cotton applicators			
5	Ointment			
1	First aid kit			
8	Medicine			
4	Scissors			
2	Tweezers			

#### The Risk of Fireworks and Rockets

The **explosion** of fireworks or rockets is an accident we can prevent. The short few minutes of joy at the party are not worth the injuries that they could cause for a lifetime.



#### **Common Disasters and Effects**

Honduras is particularly susceptible to **hurricanes**, flooding, and earthquakes. Drought and forest fires are also common.

The most pervasive effect is that the poor get poorer because they lack the money or the social capital to rebuild. A large number of Honduras's population already live below the poverty line.



Disasters create long-term effects and vulnerabilities, which, are not immediately visible.



# **Game Time!**

#### Who can solve it?

Divide the class into three groups and write the following scenarios on the board:

- 1. Two workers were in an elevator. They called the fire brigade because they were worried about suffocating.
- 2. A truck driver went to hospital after he started to swell up quickly.
- 3. A gym teacher at school picked up the phone and collapsed.

These are all true stories about accidents that happened to people at work. Give each group ten minutes to invent an explanation for each story. Nominate one person from each group to explain their group's ideas to the rest of the class. The group with the best description wins.

# **Application**

- Answer the following questions to check your knowledge.
  - 1. What is the number of the Honduran Red Cross?
  - 2. What should you do if someone is bleeding? Put pressure on the wound.
  - 3. What injuries can fireworks cause?

    Burn wounds and a lot of damage to the arms and hands.



# Lesson 22 The Nutritional Value of Food



Warm-up

**Nutritional** value refers to the contents of food and the impact of those things on our bodies. It is about carbohydrates, fats, proteins, minerals, vitamins, sugar, fat, and salt. It shows how much of each the food contains. We need to make sure we take in a good balance of everything.

Look at the food below and circle the food that you think has the most nutritional value.



















Learning

**Balanced Diet** 

A diet that includes all the nutrients in the right proportions to help our bodies function properly.

Think about it... What is a balanced diet?



A balanced diet is one that includes all the nutrients in the right proportions to help our bodies function the way they should. This diet should consist out of fruit and vegetables, meats and other animal products, and minerals.





How does food stay fresh on shop shelves for longer than 1 week?

They apply correct storage methods for the different items of food.

 Food has three functions in our bodies. Look at the functions and the descriptions in the table. Write the number of the function in the block next to the correct description.

1. Build and repair	3	Vitamins and minerals mostly in fruit and vegetables. Make soldiers to protect our bodies (immune system).
2. Energize	1	Rich in protein like milk and meat. Build and repair bones and muscles.
3. Protect and regulate	2	Rich in fats and carbohydrates like butter and rice. Gives energy to play, run, and work.

# Think about it... What does it mean to process food?



## **Application**

Write short answers for the questions.

Food that had mechanical or chemical operations performed to preserve it.

What did you eat for breakfast?  O.A.	W. CHILD
Is there something else you would rather have chosen for breakfast?	
O.A.	



## The Processing of Food

Food is processed to keep it fresh for longer.

The healthiest way to eat food is to eat it as close to its natural state as possible. That means fresh, with no preservatives and even raw.

The longer we want food to last in our cupboard, the more preservatives are put into it.

When we put food through processes, like canning or bottling, the nutrition levels change.

fresh



Fresh food



Preserved food

# **Application**

canned

hands

• Complete the following sentences with words from the word box.

hot

meats

1. Check the <u>expiration</u> date on food before you use it.
2. Always wash your <u>hands</u> before eating or working with food.
3. Cook <u>meats</u> properly and don't let it be outside in <u>hot</u> temperatures.
4Wash fruits and vegetables before using them.
5. It is better to eat <u>fresh</u> corn than <u>canned</u> corn.

Wash

expiration

# Think about it... What do babies eat?



Breast milk or formula.

# **Nutrition and Pregnancy**

You can choose what you want to eat today, but when you were a baby your body could not eat solid foods. You didn't even have teeth for chewing.

A baby's small body needs all the nutrients it can get to grow and stay healthy.

A mother is the engine that has to produce the fuel for her baby to grow. This means that the mother's healthy diet is extremely important.

Babies need a superfood. Breast milk is the superfood for babies up to the age of 8 months when they start eating solid foods.

Breast
milk has all
the food types
in one and being
so close to their
mother strengthens
the bond between
the mother and
the baby.

Did you know?
Breastfeeding
exposes a baby to
many different tastes.

# Application

 Complete the menu for the day with three nutritional meals for a mother that is five months pregnant. Remember to have a balance on the plate.













# Application

 Put an X over the food that has low nutritional value for a baby.











## **The Paper Bag Test**

#### You will need

- Food items: apple, avocado, beans, cheese, lettuce, potato chips
- Cutting board and knife
- Pencil, notepad, and a marker
- Brown paper bag
- A ruler or measuring tape

#### **Steps**

- 1. Slice the food into pieces that are roughly all the same size.
- 2. Draw a table with six squares on the brown paper bag and write the name of each food item in a square.
- 3. Put the food item in its block and leave it for 5 minutes.
- 4. On your notepad, write down what the size of the fat stain on the paper bag is after 5 minutes.
- 5. Then predict what the size will be after 30 minutes.
- 6. Finally measure the size of the stain after 30 minutes and answer the following questions:
  - a. Based on the paper bag, which food contained the most fat?
  - O.A. Depending on the size, a correct answer could be avocado, cheese or potato chips.
  - b. Which foods have invisible fats in them?
    O.A. Depending on the quality, a correct answer could be cheese or potato chips.
  - c. Which vegetable contained fat?

    Avocado

## **Application**

- Your best friend is obese and asks you to help him/ her to pick three things to focus on to be healthier. What would your advice be?
- 1. Eating a healthy diet.
- 2. Getting some exercise.
- 3. Drinking enough water.

Learning

#### **Problems With Nutrition**

#### Undernutrition

Eating food that doesn't give you enough proteins.
Symptoms are slowing of development, fatigue and infections.





#### Malnutrition

Poor nutrition because your food intake isn't healthy. A form of malnutrition is **obesity**.



#### Learning goals

- Understand and apply the hygiene rules regarding food preparation and preservation.
- Identify, explain, and practice all the hygienic measures necessary for the handling, preparation, consumption, and preservation of food.

#### **Standard**

Classify foods by their characteristics and their nutritional function.

#### Content

- Methods of preservation and ways to preserve food at home
- Preventing food poisoning



#### Key Language

**bacteria.** Organic compounds occurring in foods and living tissues.

**pickling.** Putting food in vinegar or brine to make it last longer.

**dehydration.** Extracting moisture from food to make it last longer.



# Science and Technology

 Ask students to watch the video about food preservation.



 Students list five preserved foods at home and explain which preservation method is used.



# **Complementary Activities**

#### Warm-up

• When introducing the topic, ask students what they understand by food preservation and what happens when we preserve food?

- Students experiment with food preservation. Students collect two slices of bread. They place one slice in an airtight container, and they leave the other slice on a plate. Students record the changes that happen.
- In groups, students play an ordering game. Teacher gives each group one food preservation process. The process must be split up into steps and shuffled. Students put the steps in order. When they are done, they get the next preservation method to order. The first group to be done with all eight preservation processes wins the game.
- Advanced students create a presentation explaining to the class what bacteria and fungi are, animals that carry bacteria and fungi and the consequences if it is ingested.
- At the end of the lesson, ask: What does it mean to dehydrate something? What are the eight ways of preserving food? How can we preserve food? Why is it important to cook food at the right temperature?





#### Learning goals

- Identify and explain the forms of malnutrition in the area, and their origin.
- Differentiate between malnutrition and poor nutrition.

#### **Standard**

• Classify foods by their characteristics and their nutritional function.

#### Content

- Proper nutrition
- Malnutrition and malnutrition conditions



#### Key Language

**healthy diet.** A healthy diet is one that helps maintain or improve overall health.

**kwashiorkor.** Form of severe protein malnutrition.

marasmus. Severe malnutrition characterized by energy deficiency.



# Science and Technology

 Ask students to watch the video about food nutrition.



 Students create a list of important foods to eat every day. Students must balance their diet plan.



# **Complementary Activities**

#### Warm-up

• When introducing the topic, ask students what they think it means when people only eat certain types of food. Ask students if they think they are healthy and if they eat healthy food. Discuss the necessity of healthy food especially for growing children.

- Students create a healthy food plate. Divide the plate into four parts. Students draw a picture under each one of the important food groups.
- As a group of four, students collect four packages from home which show the nutritional value of the item. Acquire items from the main food groups. If the nutritional value is not on the packaging, they can search for the answer on the internet. Cut out the nutritional information of all (or write it down) on a poster. Explain which is more nutritional and better for them.
- Advanced students research and present the causes and effects of malnutrition. They should choose one malnutrition condition as an example.
- At the end of the lesson, ask: What is a healthy diet and proper nutrition? Name the essential nutrients needed for the body? What is stunting? What are consequences of malnutrition? Explain Kwashiorkor and Marasmus.



# **Lesson 23** Food Preservation and Hygiene



Warm-up

Food preservation is how we prepare food for safe, long-term storage. Food is tasty when it is fresh, but when food starts to get old, it is not tasty or safe to eat. Before refrigerators, how could a person keep food from spoiling? O.A. Examples: pickling, drying, salting, or smoking.

# Vocabulary Match the picture with the word. bacteria pickling dehydration

# Learning

#### **Methods of Preservation**

Food preservation methods include:

- 1. Drying taking out water
- 2. Freezing putting into low temperatures
- 3. Pickling adding an acid to keep fresh
- 4. Canning cooking and putting in a can
- 5. Storing in air tight containers

- 6. Salting adding salt to take out moisture
- 7. Sugaring adding sugar
- 8. Smoking halfway cooking meat

# **Application**

• Look at the pictures below and match the description with the picture from the list above.



**Pickling** 



Freezing



Airtight containers



Sugaring



Salting



Canning



**Smoking** 



Drying

#### **Ways to Preserve Food at Home**

# Think about it... Can we preserve food at home?



Now that you understand methods of preserving food, it is important to also know which methods you can use naturally at home or for which methods you require some level of technology.

Natural conservation methods include smoking, pickling, cooking, and salting.

Yes. By using different food preservation methods that we have access to.

Technology in the preservation of food includes methods like packaging, drving, **dehydration**, refrigeration, and freezing.

The technique you use for preserving the food will determine how long you can store that food without it becoming bad for you.

# Application

 Are the same fresh fruits and vegetables available in your supermarket or fresh market? Why is that?

Yes. It is possible because in Honduras fresh fruit is produced locally.

# Critical Thinking

What are the factors needed by bacteria and fungi to grow?

Food, warmth, and moisture.

#### **Application**

 Look at the picture and answer the questions.



Can you explain what you see in the picture of the bread?

Mold on bread from fungi or bacteria.

Do you think it is still healthy for us to eat that bread? No, it will cause food poisoning.

#### Learning

# **Bacteria and Fungi**

**Bacteria** and fungi that are floating in the air land on the food. As they grow, the bacteria and fungi produce chemicals that allow them to affect the foods.

All they need to grow is food, warmth and moisture. These chemicals can make us ill. We can get diarrhea, vomit, a stomachache, or food poisoning as a result of eating food with bacteria.

# **Think about it...** Is it possible to prevent food poisoning?



# Learning

How to Prevent Food Poisoning with Common Food					
Туре	Avoid	Better Choice			
Meat and Poultry	Raw or undercooked meat or poultry.	Meat or poultry cooked to a safe temperature			
Dairy	Unpasteurized (raw) milk	Pasteurized milk			
Eggs	Foods that contain raw or undercooked eggs, such as: • Homemade Caesar salad dressing • Raw cookie dough	Use pasteurized eggs and egg products when preparing recipes that call for raw or undercooked eggs			
Vegetables	Unwashed fresh vegetables, including lettuce and salads	<ul><li>Washed fresh vegetables, including salads</li><li>Cooked vegetables</li></ul>			
Cheese	Soft cheeses made from unpasteurized (raw) milk, such as blue-veined, feta, Brie, and Camembert	<ul> <li>Soft cheeses that are clearly labeled "made from pasteurized milk"</li> <li>Processed cheeses, cream cheese, mozzarella, hard cheeses</li> </ul>			

# Application

• Here are four pictures with four descriptions. Match the correct picture with the correct description.

These are the ultimate four safety tips you should remember with food.









Separate Work separately with raw meat and vegetables Cook
Prepare food
at the right
temperature

Clean Wash hands and surfaces often Cool Refrigerate properly



#### **Food Safety Inspection**

#### You will need

- Construction paper
- Craft supplies, pens, and glue
- Pictures
- Notebook for planning

#### Instructions

You are the food safety officer of your school. Every week you do an inspection of all the kitchens on the premises.

Work in groups of five and make a visual, colorful poster of all the tips for food safety. Do the poster in a checklist format so that staff in the kitchens can make a mark next to the safety tips that are in place.



- Find the following words in the word search:
- Salt Canning
- Smoked Drying
- Freezing Sugar
- Pickling











#### Did you know?

Long ago, people had rooms underneath their houses. where it was cooler to keep food fresh for longer.



F	1	F	W	Ν	L	W	В	S	Τ	Κ	F	Υ
	R	P	(S)	F	Р	Ρ	Μ	Υ	В	Ν	G	G
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S	W	Χ	W	J	G	Ν	G	Ζ	U	Ν	Ζ	С

# **Lesson 24** Malnutrition and Poor Nutrition



Warm-up

Make a list of everything you have eaten so far today. Remember to include the snacks.

O.A.

Looking at your list, do you think you have eaten a healthy diet today?

O.A.

What does a **healthy diet** look like?

A healthy diet means eating a good balance between healthy fats and vegetables, fruits, and meats.

Vocabulary Match the picture with the word. healthy diet Kwashiorkor Marasmus

Think about it... What foods are healthy?



Fruit, vegetables, meat, dairy, nuts, grains, etc.

# Learning

Proper nutrition is very important to maintain a healthy body and mind. The body requires over 40 essential nutrients to function properly, including vitamins, minerals, amino acids, protein, and carbohydrates.

# **Application**

 Look at the pictures and circle the healthy food choices.



























#### **Malnutrition**

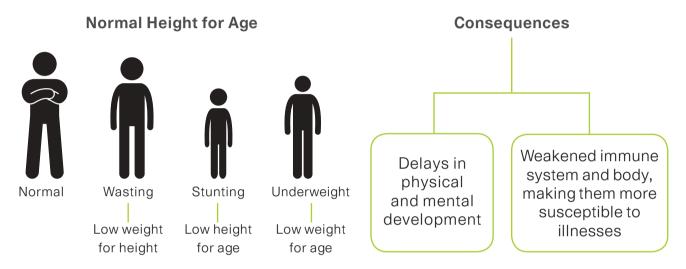
Malnutrition is when a person's diet has an imbalance of the essential nutrients. It can be grouped as under nutrition and over nutrition.

#### Did you know?

Poor nutrition causes about 45% of deaths among children under 5 years of age in the world.



Over nutrition occurs when a person eats excessively, far more than their dietary needs. It can lead to heart disease, obesity, or other dietary disorders.



## **Application**

• Read the information about John. Then, come up with a solution for his problem. Draw four ideas to help him.

John suffers from malnutrition as a result of irregular access to food and not getting enough calories. He might also not be getting enough of various micronutrients.

- John's family has had economic difficulties; his dad can't work, and then his mom lost a shift. That meant they couldn't buy enough groceries to last for the week.
- John's family eats cheap foods with long shelf lives.
- John grows tired easily; he has low energy.
- John's sisters get sick often.





#### **Malnutrition Conditions**

Are there malnourished learners you may know? O.A.

Read the information about two nutritional diseases called **Kwashiorkor** and **Marasmus**. Write one letter in each circle to find out the names for the specific symptoms. Then write the name of the disease on the line.

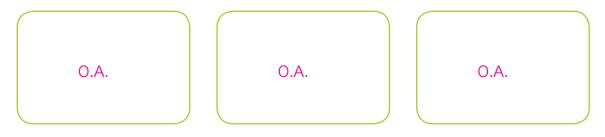




High quality protein is what children with Kwashiorkor need. Marasmus patients need a specialized diet and a rehydration plan.

# Application

• Draw pictures of the best three sources of protein that you can buy in a grocery store close to your home.

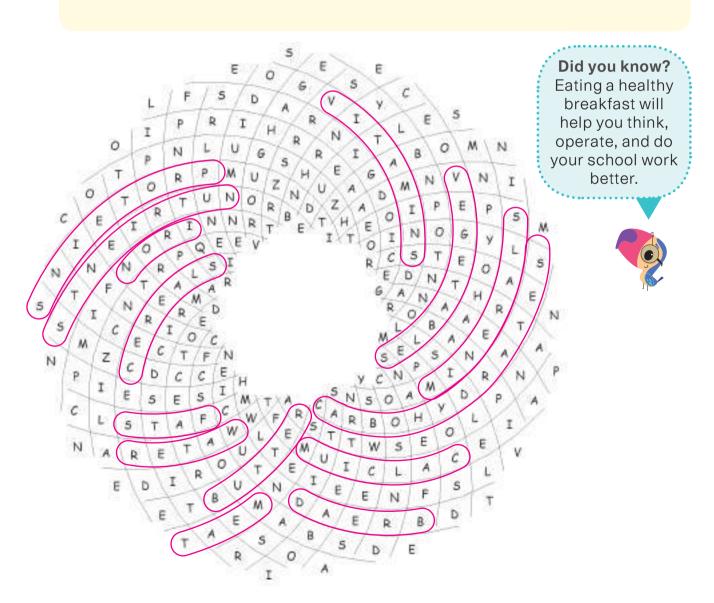




#### Unscramble - Who is the Fastest

Work with a partner. Unscramble the words and then circle them in the spiral. You must look for the correctly spelled word. Words are in a straight line moving along the spiral arms. Some of them are upside down, so look carefully.

Nutrietsn	Nutrients	nrol	Iron	taminsVi	Vitamins
rbohydratesaC	Carbohydrates	alCcium	Calcium	aFts	Fats
oteinsPr	Proteins	sealCe	Cereals	Vegetesabl	Vegetables
rtteB	Butter	Mate	Meat	Beadr	Bread
eWatr	Water	inerMals	Minerals		



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#### Learning goals

- Know the functions that water plays in our body.
- Describe the most important processes in which water participates in their body.
- Learn to prevent dehydration through proper food management and hygiene.

#### **Standard**

Classify foods by their characteristics and their nutritional function.

#### Content

- Water and human body
- Preventing dehydration

- Water's process in the body
- Water's function in the body



#### **Key Language**

**solvent.** Able to dissolve other substances.

**temperature.** Degree or intensity of heat present in a substance or object.

**organs.** Part of an organism which is typically self-contained.



# Science and Technology

 Ask students to watch the video about water in the human body.



 Students create a mind map showing the uses of water and how they lose water.



# **Complementary Activities**

#### Warm-up

• When introducing the topic, ask students what would happen if we did not have water. Discuss how much water students drink in a day and explain why it is important to get enough water in their systems.

- Students draw a flow diagram showing the flow of water from drinking it until they lose the water in different ways.
- In pairs, students go outside. The teacher provides students with paper which they
  can stick together to make one large sheet. One student lays down on the sheet of
  paper and the other student draws their outline. Together, the students draw and
  color the amount of water in their bodies. Students draw in the main parts of the
  body which use water.
- Advanced students create a presentation explaining water function in their bodies. They must use pictures and prepare an oral presentation to explain their findings.
- At the end of the lesson, ask: What is a solvent? Name the things water does for our bodies? How much water does a newborn child's body consist of? When we are seniors, how much water will we have lost since we were newborn?





#### Learning goals

- Know the ways in which water changes state.
- Identify main sources of water and understand the water cycle.
- Learn the principles of the correct management of water.

#### **Standard**

• They identify main water sources in the environment and practice conservation measures.

#### Content

- States of water
- How humans use water in its different states
- The three states of water in the water cycle
- The conservation of water on Earth



# Key Language

**solid.** Firm and stable in shape; not liquid or fluid.

**liquid.** Substance that flows freely, but is of constant volume.

**gas.** Substance or matter in a state in which it expands freely.



# Science and Technology

 Ask students to watch the video about states of matter.



• Students draw pictures showing the different states of matter.



# **Complementary Activities**

#### Warm-up

• When introducing the topic, ask students to discuss water and how it changes from one form to another.

- Students do an experiment to show the three different states. Mix a gassy soda with ice cream in a container. This shows all three states, the soda- liquid, the ice creamsolid, and the gas in the soda or the gas from the reaction when pouring the soda over the ice cream.
- As a group, students make a big ball of paper. Using paint or crayons to color all sections of the Earth that have water and earth. Color all the saltwater, light blue, and the fresh water, dark blue, the ground or earth can be green or brown.
- Advanced students create a brochure for their community explaining the need to conserve water.
- At the end of the lesson, ask: What is solid, liquid, and gas? Describe pure water.
   How do humans use water? What is the flow of water around the Earth called?
   Where does water come from?



# **Lesson 25** Water and Organisms



Warm-up

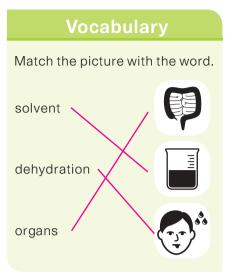
All living organisms require water for survival. For example, all oxygen-dependent organisms need water to help with respiration. Living organisms use water in many different ways.

Draw a blue circle around the picture where water is a living environment; and draw a red circle around the picture where water is used to cool down high temperatures.







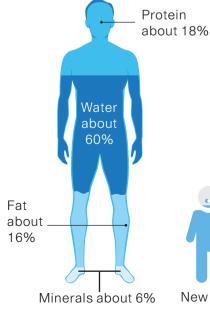


Learning

The way water is used by an organism can be categorized in four different ways: as a **solvent**, as a way to resist high temperatures through sweat, as a metabolite (involved in cell actions), and as a living environment.

# **Water and Human Body**

Look at the image that shows how much water there is in the human body.

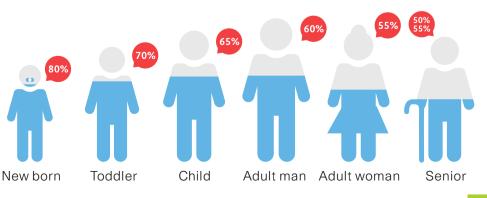


# **Application**

 Write the correct word from the box to complete the sentences about the function of water in our bodies

Moistens temperature joints constipation oxygen

- temperature 1. Water regulates body
- 2. Lubricates our \_\_\_\_
- 3. Helps with <u>constipation</u> .
- oxygen 4. Carries to the cells.
- Moistens tissue like our eyes, nose, and mouth.





# **Critical Thinking**

What is Dehydration?

Is the process of drying food based on the same principles as dehydration?

Yes, because it removes water moisture from the food.

Dehydration occurs when our body loses more water than it takes in. Mild dehydration can cause headaches, nausea, and fatigue (tiredness).

You may need more water in hot temperatures or if you sweat a lot.

Dark yellow urine is a sign of dehydration. If you are getting enough water, you will rarely feel thirsty.

Learning

## **Preventing Dehydration**

Think about it...
Can we prevent dehydration?



The most reliable prevention methods are to ensure you drink enough water for your body weight and that you eat enough hydrating foods.

Yes, by drinking a lot of water.



These are pictures of the top ten most hydrating foods. All of them contain above 90% water.

Read the percentages and write the name of each type of food.

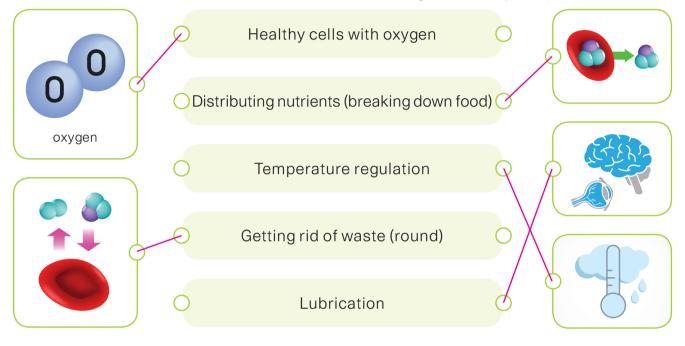
<b>9</b>	<u>Watermelon</u> 96% water		Cucumber 96% water
	<u>Coconut water</u> 99% water		Celery 95% water
	Tomatoes 94.5% water	SW	Starfruit 92% water
	Lemon 90% water	00	Grapefruit 90% water
	Lettuce 95% water	A STATE OF THE PARTY OF THE PAR	Lime 90%+ water

## Water's Function in the Body

 Read the descriptions, and draw a line from the function of the body to its picture.

# Think about it... Why is water so important in our bodies?

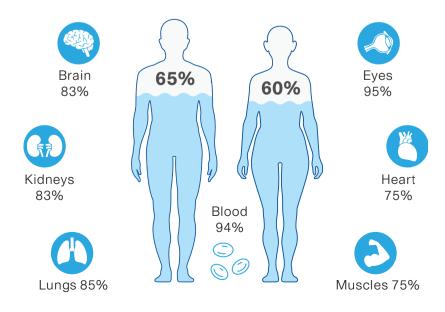
The body uses water for its cells, tissues, and organs. It also regulates body temperature.



# **Water Content in the Body**

Learning

The image below shows the amount of water that the most important **organs** in the body contain.



# **Application**

#### **Your Water Intake**

1. How many glasses of water did you drink yesterday?

#### O.A.

2. Do you drink more water in the summer than in the winter?

#### O.A.

3. What activities make you thirsty?

#### O.A.

#### Water's Process in the Body

Water leaves the body in four main ways: through the kidneys (urine), skin (sweat), large intestine (feces) and the mouth (mucus). Water travels through our digestive system as well as our bloodline.





# Be a Scientist

# **Testing Water as a Solvent**

#### You will need

Candy Hearts (with words), three clear cups with cold, warm, and hot water, spoon

## **Steps**

- 1. Fill your cups with equal amounts of water at different temperatures. One cold, one warm, and one hot.
- 2. Make predictions: Which temperature of water do you think will make the candy hearts dissolve the fastest? Why?

O.A.

- 3. Now add the same amount of hearts to all three containers using the spoon.
- 4. Record the start time and observe what happens.

O.A.

- 5. How long did it take for each container to dissolve the hearts? O.A.
- 6. Which water temperature would you say is the best solvent? O.A.

# **Application**

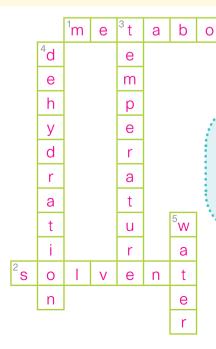
Complete the cross word puzzle.

#### Across

- 1. The process of my cells using food: metabolism
- 2. Because things dissolve in water, it is also called a solvent .

#### Down

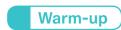
- 3. When I sweat, it is water regulating my temperature
- 4. When we don't have enough water in our bodies: dehydration .
- 5. Living organisms depend on it to survive: water



Did you know?
A person can
only live about
one week
without water.

m







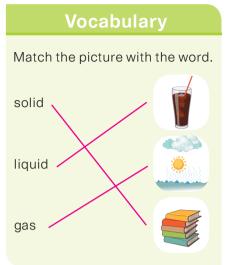
Everything around us is made up of matter. Matter is anything that takes up space and can be weighed. All solids, liquids and gases in the universe are matter. Matter is all around us and will always be in one of these three states. Think about your ice cream on a hot summer's day. What will happen to your ice cream if you leave it out in the sun?

Draw pictures to illustrate the change.

Draw ice cream.



Draw melted ice cream.



Think about it... What states can water be in?

Solid - ice, liquid water, gas - steam.



## Learning

Pure water is tasteless, odorless, and colorless. Water can be in three states: solid (ice), liquid, or gas (vapor). Take a look at the properties of water in each state.

#### States of Water

Solid water is frozen water. When water freezes, the molecules move farther apart, making ice less dense than water. This means that ice will be lighter than the same volume of water, and so ice will float in water.

Liquid water is wet and fluid. A fluid means it can flow, so it needs to be in a container. This is the form of water that we are most familiar with. We use liquid water in many ways.

Water as a gas is always present in the air around us. We cannot see it. When you boil water, the water changes from a liquid to a gas or water vapor. As some of the water vapor cools, we see it as a small cloud called steam. This cloud of steam is a mini version of the clouds we see in the sky.

## **Application**

 Label the three states of water.



Solid



Gas



Liquid

#### **How Humans Use Water in its Different States**

We use water for more than just drinking. We use it in agriculture to grow food, to wash our clothes, and to wash dishes.

Water in its solid form can be seen in your freezer. This state of water helps to store food for a longer time and to make ice that we put in our soft drinks on a hot summer's day.

Water has force and people have used its power to produce electricity. There are dams where strong currents go through and that energy is changed into electricity.

Water is also used to put out fires by putting a barrier between the fuel source and oxygen. The cooling effect also changes the water from a liquid to a gaseous state.

Learning

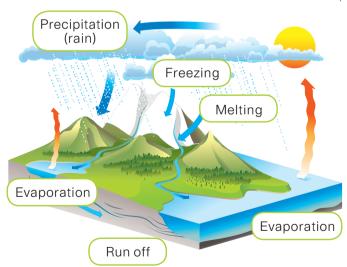
Rain from clouds that form in the sky and then flows to the seas through run off water.

The water cycle refers to how water changes from one state to another in a cycle. It takes place all around the world.

Think about it...
Where does water come from and where does it go?



- The Sun's heat causes water to evaporate from the seas, streams, rivers, and lakes.
- 2. The water vapor rises into the air.
- 3. High up the air is cooler and the water vapor turns into millions of water droplets, which form clouds.
- 4. The clouds get bigger and it starts to rain. This is called precipitation.
- 5. In other clouds, which become really cold, the water vapor freezes and forms snow.
- 6. Runoff water that falls to the ground flows down the rivers to the seas.
- 7. This water will evaporate again, restarting the water cycle again.



## Application

Look at the water cycle image.
 Use the image to explain the water cycle to your partner and see if you understand all of the processes.

## The Three States of Water in the Water Cycle

Once again, we see how important the Sun is for life on Earth. Without the heat from the Sun, the water cycle would not happen! Without the water cycle, we would run out of water sources, and that would make life on Earth for living organisms impossible!

Can you identify the three states of water in the water cycle? Label the processes as solid, liquid, or gas.



What would happen if the water cycle was unable to change into all three states?

The Earth would run out of water.

## Did you know?

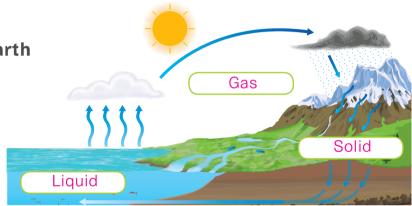
The water cycle is also called the hydrologic cycle.



## Learning

#### **Water Sources on Planet Earth**

Earth's water is (almost) everywhere - above the Earth in the air and clouds and on the surface of the Earth in rivers, oceans, ice, plants, and in living organisms. Water is also inside the Earth.



About 70% of the Earth's surface is covered with water. 97% of this water is saltwater and cannot be drunk.

Less than 1% of all the water on Earth is fresh water that can actually be used.

People use this small amount of water for drinking, transportation, heating and cooling, industry, and many other purposes. This ice is fresh water and could be melted; however, it is too far away from where people live to be usable. 2 % of the water on Earth is glacier ice at the North and South Poles.

## **Application**

- Write T for true and F for false.
  - 1. Water in its gas form is called water vapor.
  - 2. Humans only need water as a liquid and solid.
  - Rain is the only type of precipitation in the water cycle.



4. The Sun's heat is responsible for turning liquid water into a gas.



5. 70% of Earth's water is usable and used by humans, plants and animals.







#### The Conservation of Water on Planet Earth

Clean, fresh water is a limited resource. With all of the severe droughts happening in the world, the limited supply of fresh water is becoming one of our most precious resources.

Conserving water is extremely important for the survival of life on our planet. It keeps water pure and clean while protecting the environment. It means we must use our water supply wisely and responsibly.

Conservation of water is very important as the uses are endless! Without water, the following would not be possible:



Growing food



Protecting ecosystems and wildlife



Animal habitats



Satisfying basic needs of living organisms

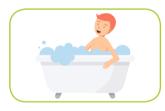
## **Application**

• Circle the things you can do at home to conserve water.











#### You will need

Big piece of white paper, markers, colored pencils

#### Instructions

- In small groups, create a poster that shows the importance of water conservation for humans, animals, and plants.
- 2. Your poster should also provide people with things they can do at home, school, in their neighborhood, and around the country to save water.
- 3. Be creative!
- 4. Visit other classrooms and tell them about the conservation of water using your poster.





#### Learning goals

- Identify and locate rivers and basins of the area and understand the relationship between the two.
- Describe the characteristics of the fluvial ecosystem formed by a river and its banks.
- Describe the various ways of using river water and polluting water while proposing feasible alternatives for more correct management.

#### **Standard**

 They identify main water sources in the environment and practice conservation measures.

#### Content

- Different freshwater resources, streams, and rivers
- Plant and animal life in rivers
- People and river ecosystems



## **Key Language**

**lotic ecosystem.** Rapidly flowing water that is moving in one general direction.

**riverbed.** The bed or channel in which a river flows.

**hydrographic.** Parts of a map, collectively, that represent surface waters.



## Science and Technology

 Ask students to watch the video about freshwater biomes.



 Students create a collage using pictures and words showing different freshwater biomes.



## **Complementary Activities**

#### Warm-up

• When introducing the topic, ask students to discuss the importance of water for all living things.

- In pairs, students research and identify any one of the water sources in the world and create a poster to display them. They use pictures and words to explain the water source.
- As a class play "Thumbs Up Thumbs Down." The students stand in a large circle.
  The teacher makes a statement about freshwater resources. The students decide
  whether it is true (thumbs up) or false (thumbs down). If a student's answer is
  incorrect, they are out of the game. The last person standing wins.
- Advanced students create a graph showing the amount of people who use river water as their main source of water in three different areas of their choice.
- At the end of the lesson, ask: What is a lotic ecosystem? What does hydrographic mean? Name the sources of fresh water? What kind of animals live along rivers?





#### Learning goals

- Identify and locate the ecosystems that exist in Honduras.
- Describe the main characteristics of marine and coastal ecosystems and identify the sources of sea pollution.
- Understand the role of the sea as regulator of the climate and the biological balance of the planet.

#### Standard

 Identify main water sources in the environment and practice conservation measures.

#### Content

- Types of marine biomes
- Ocean plant and animal life
- The ocean and our weather and the use of ocean resources



## **Key Language**

**marine biome.** Is a division of aquatic biome, which also consists of freshwater biome.

**coral reef.** Ridge of rock in the sea formed by the growth and deposit of coral.

**estuaries.** The tidal mouth of a large river.



## Science and Technology

 Ask students to watch the video about the ocean biome.



• Students draw an ocean biome.



## **Complementary Activities**

#### Warm-up

 When introducing the topic, ask students to discuss oceans and explain what they know about them.

- Students play "Bingo." The teacher provides students with a blank Bingo card. Students fill it with names of animal and plant life found in and around the ocean. The teacher then calls out animals and plants found at the ocean. If a student has it written down on their card, they cross it out. The first student to get three words in a line crossed out wins the game.
- In pairs, students research and present findings on the different oceans on Earth.
- · Advanced students create a food web of animals in the ocean starting with a plant.
- At the end of the lesson, ask: What is an estuary? Name and explain the three main types of marine biomes. How do people pollute the ocean? How do people use oceans for resources?



## Lesson 27 The River Ecosystem



Water is life! You have learned about the importance of water for humans, plants, and animals. Look at the pictures below and discuss with your friends where the water for the activities comes from.





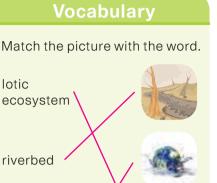






All the water we use in the house comes from freshwater resources such as rivers, lakes, lagoons, creeks, dams, etc. We can also eat the fish in freshwater ecosystems.





hydrographic .



Think about it What are the different freshwater resources?

Rivers, streams, ponds, lakes, wetlands, dams, etc.)



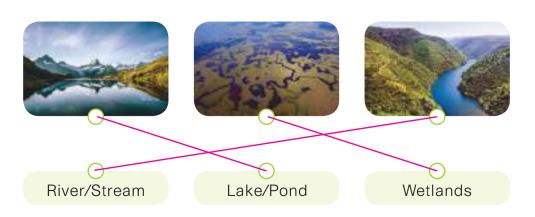


#### **Different Freshwater Resources**

Have you ever gone swimming in the ocean and accidentally swallowed some water? It tasted salty, right? Well, you won't have the same yucky taste in your mouth if you swallow water in a lake or a pond. These bodies of water that have low levels of salt (typically less than 1%), are called freshwater. We know our freshwater resources are limited!

## **Application**

 Draw a line from the picture to the name of the freshwater resource.



# **Think about it...**What is a main characteristic of a stream?

## **Streams and Rivers**

Rivers and streams are often called **lotic ecosystems**.

There is constant flowing water and a streambed.

This means that they have flowing waters, unlike the still waters of ponds and lakes.

Streams and rivers can vary in size from small trickling streams to mile-wide rivers that travel for thousands of kilometers.

Key factors that influence streams and rivers are:

#### **Flow**

The amount of water and the strength at which it flows will impact the types of plants and animals that can live in a river.

#### Light

Light provides
energy to
plants through
photosynthesis.
The amount of light
due to seasons or
location will impact
the ecosystem.

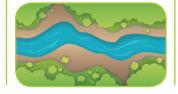
#### **Temperature**

The climate of the land that the river is flowing through will have an impact on the local plant and animal life.

#### Chemistry

The earth
structure of the
area that the river
flows through
impacts the
soil, rocks, and
nutrients of the
river.









## **Streams and Rivers in Honduras**

Can you recognize some of these rivers found in your country? Write the name below the picture.



Ulúa River



Choluteca River



Aguán River

## **Application**

 Invite an elder to your classroom and ask them to show you photos of what the rivers in Honduras looked like when they were young. Find out what they used the rivers for and compare it with what people use them for today. Write down everything you learn about the rivers in Honduras.

O.A.			



#### **Rivers**

#### Did you know?

Some ecosystems disappear when rivers are regulated or impounded.



Rivers are born in mountainous areas and move through a **riverbed** that finally ends in the sea, a lake, or another river.

Rivers have a great variety of freshwater fish.

Their banks can be home to several mammals, including humans, because mammals need to stay near water.

Honduras is a country of great **hydrographic** wealth because it has a lot of long, flowing rivers, such as the Coco or Segovia, Chamelecón, Ulúa, and Patúca, which end in the northern part of the Caribbean Sea.

The Lempa, Goascorán, Nacaome and Choluteca rivers end in the Bahía de Fonseca, in the south of the country.



#### **Plant Life in Rivers**

- Plants and algae are important to river ecosystems. They provide oxygen through photosynthesis and food for animals.
- Plants also protect animals from strong currents and predators.
- Algae that is on the surface of ponds and lakes are a favorite for animals like turtles.
- Plants have strong roots and stems that bend easily or mosses that cling to the rocks to prevent them from being carried away in the streams.

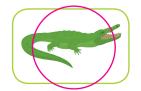


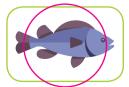
#### **Animal Life in Rivers**

River animals need movement of the stream or river water to survive. Fish are food for prey species and their survival depends on speed, and the duration of that speed. Birds inhabit river ecosystems. Insects are found on the water surface and under stones.

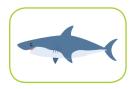
## Application

• Circle the animals you would find at river ecosystems.











## **People and River Ecosystems**

Since the beginning of time, people have settled close to rivers to survive. Read about the uses rivers give to people nowadays.

Provides Water	Sand Mining	Hydroelectric Power
People use river water for drinking. Activities like boating and fishing are common.  Water can be used to transport good and tourists on boats.	The sand extracted from rivers can be used in construction to make concrete. Sand can also be used to make glass.	Water passing through a dam in a river can produce electricity. A turbine inside the dam has magnets and metal to use the strong river current to produce energy known as electricity.

#### **How to Protect Our Rivers**

Save water.

Do not pollute.

Get involved.

- Be careful with what you put down the drain.
- Fertilizing lawns with chemicals pollutes underground water, and so do cars that drip oil.



## **Game Time!**

#### You will need

Paper, markers, 3 hula hoops

#### Instructions

- Create picture cards of all the ways people, animals, and plants are involved in rivers.
- 2. Label your hula hoops as people, animals, and plants.
- 3. Sort your picture cards in the correct hula hoop to see how people, animals, and plants use rivers differently.
- 4. Take the "People hula hoop activities" and separate the cards as negative (harmful) and positive.
- 5. Look at the harmful activities and discuss ways people can try to change the ways they perform these activities to cause less harm to river ecosystems.



## **Critical Thinking**

Where does river water come from?

River water comes from the runoff water caused by the water cycle.

## Application

 Explain how hydroelectric power and sand mining can be harmful to a river ecosystem.





Harmful effects of hydroelectric power: Can change the flow of water.

May harm animals and plants when entering the turbine.

Harmful effects of sand mining:
Changes the habitat of river ecosystems.
My harm animals and plants.
Causes erosion and may cause flooding.

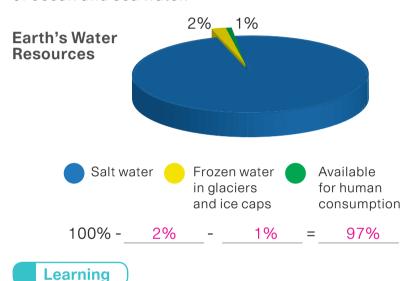
## Lesson 28 Ocean Ecosystems



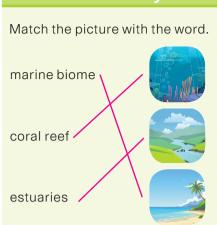
Warm-up

It's hard to imagine life on Earth without oceans. The air you breathe used to be an ocean breeze. The water you drink was once in a cloud over the ocean

The ocean is also important to the many species of plants and animals that call the water their home. This community of organisms is called an ocean ecosystem. Just how much of the Earth's water resources are salt water? Use the graph below to calculate the percentage of ocean and sea water.



## Vocabulary

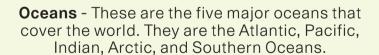


#### Did you know?

Seas and oceans are different. Seas are smaller than oceans and are usually located where the land and ocean meet. Typically, seas are partially enclosed by land.

## **Types of Marine Biomes**

Although the marine biome is primarily made up of the ocean, it can be divided up into three types:



Coral reefs - Coral reefs are small in size and include the colonies of reefs and all the species that develop around them.

Estuaries - Estuaries are areas where rivers and streams flow into the ocean.





Sea

#### **Ocean Plant Life**

Marine plants
live in the upper
zone of the
ocean because
they need
sunlight to create
food through
photosynthesis.

Examples of marine plants are seaweeds, marine algae and sea grasses. Mangrove trees are also part of the tropical shores.

Kelp is one type of marine algae. It provides food and shelter to ocean animals and is even used by humans in ice cream and toothpaste.

Phytoplankton is the food for many ocean creatures, from the largest whales to the smallest fish. It produces about half of the oxygen of the world.



## **Critical Thinking**

Have you ever seen other types of plants when swimming in the sea?

## **Application**

• Draw a line from the picture to the plant name.

Yes or no.









Phytoplankton

Kelp

Mangrove trees

Marine plants

Think about it...
What animals are in the ocean?



Fish, sharks, dolphins, crabs. etc.

Learning

#### **Ocean Animal Life**

Most marine animals live in the top two ocean zones (sunlight and twilight zone), where they have access to plants and other ocean animals to eat.

There is a large variety of animal life in oceans, such as fish, mollusks, dolphins, seals, walruses, whales, crustaceans, bacteria, sea anemones, etc.

The ocean is home to the largest animal species on Earth: the blue whale. The blue whale can grow to be 25 meters.

The deep ocean includes strange animals like an angler fish.

It creates its own light with a lure to attract other animals to it.

## **Application**

- Find the ocean animals in the word search.
- Fish

- Crustaceans
- Mollusks
- Crabs

Seals

- Lobster
- Walruses
- Bacteria
- Whales
- Anemones

## Learning

#### The Ocean and Our Weather

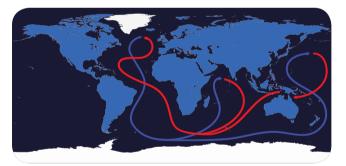
The ocean plays an important role in shaping our climate and weather patterns. It continuously exchanges heat, moisture, and carbon with the atmosphere, influencing our weather patterns and making subtle changes to the climate. Ocean currents transport warm water from the equator toward the poles and cold water back from the poles.

#### XSUDUMOLBKAA OCP R O NSNBACTER A) N 0 RGKIXLS S/SDPED UF SG QEIEHFG/E/BGOM Χ Т I K F S Z P/L F SEALSA Ν G ΑЕ СЕ ELNL/H/IGONNAE HXIWLGWGDW ΕL L IMOLL ΑΥ US K S/L)R S U NF CVMRPEPUOK D S Y X Q W R M CXB E N S E V R RJDCSESRDI S DOGQ I/T/N O Н SEEG/E/G F RLS R G C W M A N S J T D T

# Think about it... Why are oceans important to humans?



It shapes our climate and weather patterns.



#### Sea and Ocean Pollution

Pollution of the seas and oceans are becoming an increasingly recurrent issue. It is our duty to be responsible and aware to safeguard the living conditions on Earth.

## **Application**

• Look at the pictures and explain how the pollution of oceans occur.



People throw trash on the beach.



Oil spills from boats.



Sewage and waste are disposed in oceans.

#### **Use of Ocean Resources**

Nearly three-quarters of the Earth's surface is covered by oceans. Fisheries supply almost 20% of the world's protein, and fishing provides a living for millions of people around the world. About one quarter of the world's oil comes from offshore wells drilled into reserves beneath the sea.



Humans have also used oceans as a convenient way to dispose of waste by dumping all kinds of pollutants into the oceans, including sewage, nuclear, and toxic wastes, without any care for marine life or the possible long term effects on the environment.

Our world oceans produce over half of the world's oxygen and store a lot of carbon dioxide. Humans use the ocean for recreational activities such as fishing, boating, kayaking, and whale watching. Ingredients from the sea are also found in foods such as peanut and soymilk!

Many medicine products come from the ocean including ingredients to fight cancer, heart diseases and many more!

Name three ways in which humans use the oceans and seas.

Breathing, transport, recreational activities, food, jobs, or medicine.

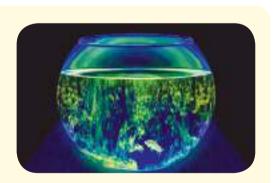


#### You will need

A clear bowl, blue gelatin dessert mix, red licorice twists, gummy fish, scissors, mint leaves, hot water, cold water, spoon

#### Instructions

- Make the ocean water with the box of blue gelatin dessert mix and put it in the refrigerator.
- 2. Use the scissors to cut the red licorice strips into short sections to make coral. Cut the mint into segments to make seaweed.
- 3. After 45 minutes have passed, remove your gelatin from the refrigerator. It should be thicker than liquid, but not completely firm.
- 4. Put in the pieces to assemble your ocean ecosystem.
- 5. Refrigerate the gelatin again.
- 6. After a couple of hours, admire and enjoy your tasty ocean-themed dessert!





#### Learning goals

- Explain what soil is and how it is formed.
- Differentiate different types of soil.

#### **Standard**

 Recognize the care and treatments that must be given to the soil to prevent erosion and maintain nutrients.

#### Content

Soil formation and different types of soil



## **Key Language**

**disintegrate.** Break up into small parts as the result of impact or decay.

**humus.** The organic component of soil.

**Earth's crust.** The outermost layer of our planet.



## Science and Technology

 Ask students to watch the video about layers of the soil.



 In groups, students create a poster showing the different layers of the soil and explaining what each layer is composed of.



## **Complementary Activities**

#### Warm-up

• When introducing the topic, ask students; What is soil? Ask students what the need for soil is and what they think would happen if we did not have soil on Earth. Ask students if they know about different types of soil and why we have different types.

- Students use playdough to build a model of the particle formation of the different types of soil. For example, the clay soil model will have tightly packed particles.
- As a group, grow a plant in different types of soil. Students get a sample of the three
  types of soil and a packet of seeds. Students put one of the soil samples and a few of
  the seeds in a container. Label the container: loam, clay, or sand. All other variables
  should be the same: amount of sun, water, and air. Note the growth until the first bud
  comes through.
- Advanced students build a physical representation of the layers of soil. They will need a 2-liter plastic bottle (must be see through) stones, rocks, pebbles, soil, leaves etc. Students should research what is needed to build each layer.
- At the end of the lesson, ask: What does disintegrate mean? What does humus consist of? What are the layers of soil? What are the three different types of soil? Explain each type of soil. What is the main function of soil?





#### Learning goals

- Describe concrete examples of rotation and combination of crops explaining what each technique consists of.
- Recognize appropriate and inappropriate techniques for soil conservation.

#### **Standard**

• Recognize the care and treatments that must be given to the soil to prevent erosion and maintain nutrients.

#### Content

- Agents of soil erosion
- Effects of soil erosion



## **Key Language**

**erosion.** The process of eroding or being eroded by natural agents.

**soil.** The upper layer of Earth in which plants grow.

**agriculture.** The science or practice of farming.



## Science and Technology

 Ask students to watch the video about soil erosion.



 Students record and explain the different types of soil erosion mentioned.



## **Complementary Activities**

#### Warm-up

• When introducing the topic, ask students what the word erosion means. Ask students if they know of places that have changed because of erosion.

- Students create a pamphlet for the community naming reasons for soil erosion, what causes soil erosion and explaining what we can do to conserve our soil.
- In pairs, play a game of "Match 3." Pairs draw pictures, write words, and use definitions to explain the causes of erosion. Pairs cut the pieces apart and swap with a different pair. Students match the three things by pasting them together.
- Advanced students research the uses of soil, focusing on one main use. Students
  explain the need for soil in these sectors and what the outcome would be if the soil
  were gone or not healthy enough to sustain life. Students draw a graph showing
  which different sectors use soil and how much of it goes to each sector.
- At the end of the lesson, ask: What is erosion? What causes soil erosion? What are some of the effects of soil erosion especially on sectors like agriculture? How can we help to protect the Earth's soil? If we lost all the soil on Earth, what would happen?







What is under the floor of your classroom? That's right, soil!

We all like to play outside with soil and mud. When we dig a hole in the ground, we can see that there are several layers. How can we see this? Sometimes the color of the soil changes or the texture feels different. If you can't remember, go outside and dig a hole. Take note of the changes you can see. Do you think it is easier or harder to dig a hole in the ground as it gets deeper? Explain your answer using the picture.



O.A.			

# Match the picture with the word. disintegrate humus Earth's crust

## Learning

#### **Soil Formation**

Soil is formed by the **disintegration** of the rocks on the surface of the layers of land formed by particles of rocks, water, air, microorganisms, rocks of different sizes and traces of plants, covering a layer of blackish color called humus.

**Humus** is a natural fertilizer produced by the remains of living things.

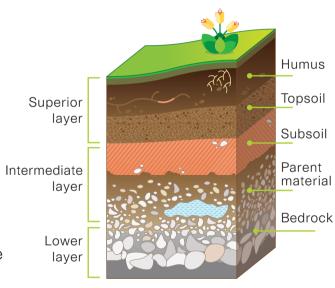
Deeper is the sub-soil, often sandy and orange in color.

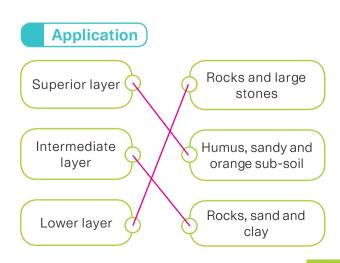
Further down is a layer of rock, called bedrock.

Water is found in cracks meters deep under the bedrock.

Kilometers deeper we find soil, oil, and gas.

All the way down, near the center of the Earth, we find rock that is hot.





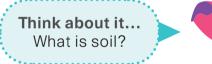


## **Different Types of Soil**

Do you think there will ever be a replacement for soil? Yes or no.

Clay Soil	Clay can be gray or red. The particles, or tiny pieces, are packed very tightly together. This causes clay to hold water because the water cannot pass through the particles. Plants rot in the water that does not drain.
Sandy Soil	Sand is made of smaller pieces of rocks and minerals. The particles are not close together and they do not stick to one another. Because of this, water drains right through sand. This means it is not good for growing plants. Plants will dry out with no water.
Muck Soil	Muck is a type of soil contains at least 50% organic matter that is well decomposed. Muck allows the slow trickle of water and preserves moisture. This is suitable for agriculture and the cultivation of vegetables and fruit trees.





It is the disintegration of rocks.

#### **Soil Conservation**

#### You will need

Material that simulates clay soil, sandy soil, and muck soil, for example sugar, rice, chickpeas, etc, 3 clear bags, colored paper, markers

## Steps

- 1. Find three different types of grainy objects that are similar to clay soil, sandy soil, and much soil.
- 2. Display the "soil" in three different clear bags pasted on colored paper and write the characteristics of each soil type.
- 3. Present it as a poster to you classmates and explain why you chose that material to simulate each soil type.

## Lesson 30 Erosion and Soil Conservation



Warm-up

**Erosion** is when the land becomes worn out. It can happen quickly, or it can take years. Erosion can affect humans in a negative way. For example, when there's soil erosion, the rocks and soil will be removed. Then there will be nothing to support a building or a house.

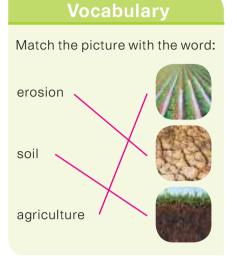
Circle the picture that shows erosion.











Learning

## Agents of Erosion

Erosion can be caused by water, wind, animals, or humans. The main cause is water, like rainfall, rivers, waves, or floods. Therefore, plants play an important role in soil conservation as it can protect the soil against different erosion factors.

Think about it. What is soil erosion?



It is when the land becomes worn out.

#### **Causes of Soil Erosion**

Soil gets carried away by heavy waters when there are no plants or roots to keep the soil in place.

In dry areas, wind is also a big cause of erosion as the soil gets blown away by strong winds.

Other factors that cause erosion are living things, such as small animals, insects, and humans.

Humans cut down trees and forests to make space for new buildings and farmlands to grow crops.

## **Application**

 Identify the causes of erosion below by writing the word from the word box under the correct picture.



Rain



Insects



Floods





Small animals



Rain

Humans

#### The Effects of Soil Erosion

Soil erosion has a big effect on agriculture.

- 1. When topsoil is washed away, it loses the moist, nutrient-rich layer and reduces the soil quality.
- 2. Bad soil quality forces the farmer to use fertilizers and pesticides.
- 3. The use of chemicals in farming can cause water pollution, eventually leading to contaminated drinking water.
- 4. Sediment accumulated obstructs the flow of water in rivers, streams, and canals, which leads to flooding.

## Soil: The Foundation of Agriculture

Soil gives humans the ability to grow plants and food and provides support for the crops grown. Soil is the foundation of agriculture. To protect soil and prevent erosion we can plant trees, grass, plants, and flowers in empty spaces. Don't overwater existing plants and improve drainage systems.

## Application

 Complete each sentence with words from the box.

destroys empty food foundation humans overwater planting

- 1. Soil gives <u>humans</u> the ability to grow plants and <u>food</u>.
- 2. Soil is the <u>foundation</u> of agriculture.
- 3. Erosion <u>destroys</u> soil.
- 4. We can conserve soil by <u>planting</u> trees and plants in <u>empty</u> places.
- 5. We must not <u>overwater</u> existing plants and grass.



## **Critical Thinking**

How can humans help to protect Earth's soil against soil erosion?

Plant vegetation, ventilate soil with earthworms, remove water from soil, plant new trees, etc.



## Hands on!

## **Conserving Soil**

## You will need

Apple, knife

#### Instructions

- 1. Work with a partner and get a large apple to represent Earth. Have an adult help you slice the apple into 4 equal slices.
- 2. Since 3/4 of the Earth is covered in water, set 3 of the slices aside.
- 3. The remaining slice represents all the land on Earth. Cut that slice in half.
- 4. One of those slices represents land that is not suitable for farming (swamps, deserts, arctic regions). Set that piece aside.
- 5. That leaves you with 1/8 of an apple which represents all the land where people can live and grow crops.
- 6. Cut that slice into 4 equal pieces: 1 piece will be land that is too rocky, the 2nd piece will be land that is too wet, the 3rd piece is land that is too hot.
- 7. The remaining piece represents all the land that can be used for farming.
- 8. How important is it to protect agricultural land?

It is extremely important because the available land for farming is limited.



#### Learning goals

Identify the sources of pollution in the atmosphere.

#### **Standard**

Identify strategies to avoid air pollution.

#### Content

- The function of the atmosphere
- Air pollution
- Reducing air pollution



## Key Language

**atmosphere.** The envelope of gases surrounding the Earth or another planet.

**air pollution.** The presence in air of a substance which has harmful effects.

**the Sun.** The star around which the Farth orbits.



## Science and Technology

 Ask students to watch the video about the atmosphere.



 Students draw a diagram showing how the atmosphere protects the Earth with each layer.



## **Complementary Activities**

#### Warm-up

• When introducing the topic, ask students what the atmosphere is and why we need it. Ask students if we did not have the atmosphere what would happen. Discuss ideas related to the atmosphere and what it contains.

- In pairs, students use magazines to cut out pictures of all the causes of air pollution. Students create a collage with the heading air pollution.
- In groups, students do an experiment called pollution jars. Each group gets three clear jars with airtight lids. On jars write, water, air, and soil pollution. Students fill relevant jars halfway with either water or soil. In the water jar, add drops of oil and shredded paper. In the soil jar add drops of oil and any garbage. For the air jar, the teacher strikes a match, and, while it is still burning drops it in the jar and closes the lid. The jar will fill up with smoke.
- Advanced students create a play for their community. Students act out things which cause air pollution and what we can do to stop air pollution.
- At the end of the lesson, ask: What is atmosphere? What is air pollution? What function does the atmosphere have? What happens to living things if they are surrounded by air pollution? How can we reduce air pollution?





#### Learning goals

- Represent and describe the structure and dynamics of the Solar system.
- Describe some principles of celestial mechanics.

#### Standard

• Identify the characteristics of the stars that make up the universe.

#### Content

- The Solar system and stars that make up the universe
- The planets in the Solar system
- Farth



## Key Language

**galaxy.** A system of billions of stars, Solar systems, gas, dust and comets.

Earth. The planet on which we live.

**stars.** A fixed luminous point in the night sky, which is a large, remote incandescent body like the Sun.



## Science and Technology

 Ask students to watch the video about the stars.



 Students explain with the use of pictures and words the similarities and differences between some stars.



## **Complementary Activities**

#### Warm-up

• When introducing the topic, ask students what they know about planets and what stars are made of. Ask students to discuss different planets and stars.

- Students do a word search. The teacher creates and hands out a word search for students to complete.
- In groups of eight, students play the "Name Game." The teacher secretly provides each student in the group with one of the planets; only that student should know what their name is. Groups ask each other questions to find out what planet they are. Each student must get a chance to ask a question. The better the question, the faster they will guess.
- Advanced students can choose and research one planet. Students should find out interesting information about the planet and share it with the class.
- At the end of the lesson, ask: What is the Sun? What is the Solar system? What stars make up our universe? What are some fun facts to know about stars? What are the eight planets in our Solar system?

## Lesson 31 The Atmosphere



Warm-up

A gaseous layer, the **atmosphere**, surrounds the Earth. The atmosphere is very important to humans and all living things on Earth. The atmosphere protects all living things and helps us to survive.

Put an X next to the image of things humans need to survive.



Oxygen

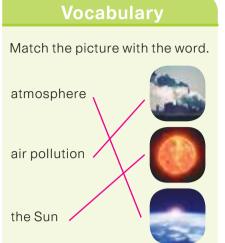


Warmth





Water



Learning

## The Function of the Atmosphere

The main function and purpose of the atmosphere is to protect the Earth. It covers the Earth like a big blanket.

Think about it... What is the purpose of the atmosphere?



It protects the Earth.

Helps to keep the heat that the **Sun** makes to keep us warm.

Contains gases that are necessary for all living things to live. We need oxygen to breathe, and plants need carbon dioxide and nitrogen to make food.

**Atmosphere Functions** 

A part of the atmosphere called the ozone layer protects us from the Sun's heat.

Keeps the temperature normal so that we don't get too cold, or too hot. This is called the greenhouse effect.

## **Critical Thinking**

What would happen if there were no atmosphere?

There would be no life on Earth.

## **Application**

Circle the functions of the atmosphere.



Protects us like a blanket



Keeps us warm



Greenhouse effect



Ozone layer



Insects can fly

Air pollution is when bad gases and chemicals get into the air and atmosphere.

Did you know? Mercury has no atmosphere which means no wind or weather.



Air pollution causes serious harm to animals, and it can damage the cycle of how things function on Earth.

Natural causes of air pollution are forest fires, dust storms, and volcano eruptions.



Humans also cause air pollution with factories. cars, power plants, and fumes from spray cans.

Air pollution weakens the ozone layer, which protects us from the Sun's UV rays, so more harmful rays gets through.

Consequences of air pollution include animals dying, the poles melting, and people getting sunburned because of intense sunshine.

## **Reducing Air Pollution**

Turn off lights and electronic devices when they're not needed, especially the lights at daytime. Walk or use a bicycle instead of taking a car. Reduce, reuse and recycle as often as you can, and throw trash in the bin. Use ecofriendly products whenever you can.

Application )

- Give the correct answer below the guestions.
- a) What happens when chemicals destroy the atmosphere?

Air pollution

b) Does air pollution harm cars or animals?

d) Name one way that humans can cause

Animals

- c) What is a natural cause of air pollution?
- air pollution.

Spray cans

#### Forest fires



## **Fighting Pollution**

#### You will need

A bag to put your objects in, classmates

#### Instructions

- 1. Go outside with your bag.
- 2. Have a look around, and see how many plastic objects or any trash you can find.
- 3. Pick them up and put them in your bag.
- 4. The first student to have their bag full wins the race and gets a prize!
- 5. Teacher will give the student a prize.

## Lesson 32 The Universe and the Solar System



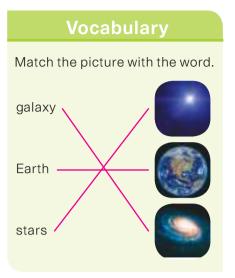
Warm-up

Planets and **stars** are all part of the universe. We don't know how big the universe is because we can't see where it ends. Write day or night below the images to tell when you would see them









Learning

## The Solar System

The Solar system is the name given to all the planets, stars, moons, comets, asteroids, and the Sun as a group together. These bodies make up the system of the universe where Earth is. Think about it... What role do stars have in the universe?

## **Stars That Make Up the Universe**

A star is a great celestial body made of many gases that produce heat and light. Groups of stars are called galaxies. The Sun is the most important star in the universe and belongs to a galaxy called the Milky Way. If the Sun did not exist, the **Earth** would die and become a lifeless rock.



#### Characteristics of stars

Stars are grouped by their color.

Red stars are called dwarfs, and they are not very bright.

Yellow stars are dwarfs too. Our Sun is a yellow star.

Blue stars are called giants. They shine brightly and are the biggest.

## **Application**

Cross out the image that does not belong to the Solar system.











## **Application**

Label the stars below as giant or dwarf.







Dwarf



What happens when the Sun doesn't shine?

It is dark and colder.

Think about it...

Name things that are part of the Solar system.

Learning

Dwarf

The Sun, the planets, satellites, comets, asteroids, and meteoroids

Most stars are red and small. Even when they are not small, we see them twinkle because of how the Earth's air moves. The smaller the star is, the longer it will live. Bigger stars burn out very fast because of their size.

Stars are rarely alone, but usually in pairs. The most important star for us is the Sun, and it is more than 4 billion years old.

## Learning



The Sun, the Earth and planets are all part of the Solar system.

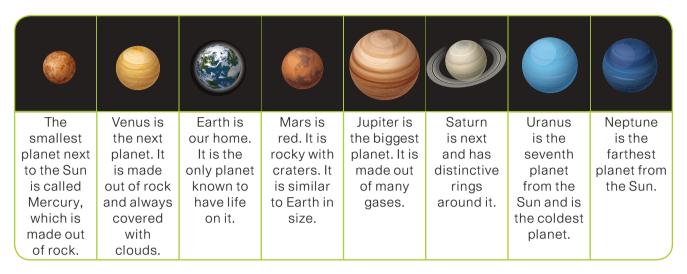
There are eight planets in the Solar system, and they all travel around the Sun.

The biggest planet is Jupiter, and the Sun is even bigger than Jupiter.

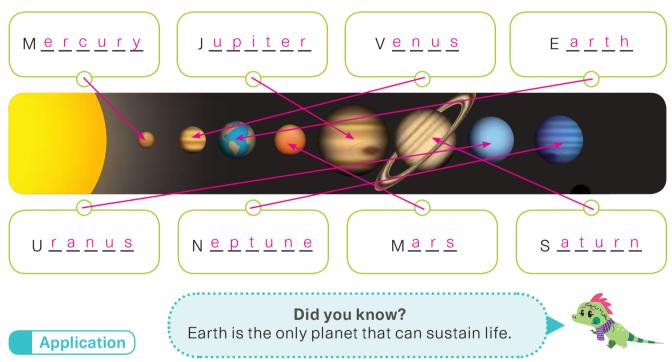
## Application

- Answer the riddles about the Solar system.
- 1. I am a big yellow star and I am very warm. What am I? \_\_\_\_\_ The Sun
- 2. There are eight of us and we travel around the Sun. What are we called? Planets
- 3. I am not the biggest planet, but you are living on me. What planet am I? \_\_\_\_\_ The Earth
- 5. I am not a planet, but I am bigger than Jupiter. What's my name? \_\_\_\_\_The Sun\_\_\_

## The Planets in the Solar System



**Application** • Draw a line to each planet and write the planet's name.



- Write the letter to match the image to the correct description.
- A) I am the planet that people live on. C) I
- B) I am the smallest planet and made of rock.
- C) I am a planet and I have a ring around me.
- D) I am the planet after Earth and I am red.









#### Let's Talk More About the Earth

The Earth is where we live. It is not the biggest planet, or the smallest planet. The word Earth means "ground" and everything that we know lives on Earth. It's the only known planet that has living things.

## **Application**

 Take turns with a friend and see if you can describe the words in the boxes. If you are able to do so, cross the word out.



Solar System

Sun



Earth



Planets



Universe

Stars





The Sun, stars, planets and Earth are a part of the Solar system.

The Sun is a star and it is yellow.

The Earth is a planet and humans live on it.

There are 8 planets with different names.

The universe is everything we can touch and see like the Sun, planets and living things.

The stars come in different colors, such as red, yellow and blue.



## **Making Planets**

#### You will need

A package of multi colored balloons, permanent markers, string or ribbon, large paper plates for Saturn's rings

#### Instructions

- 1. Work in pairs.
- 2. Write the section explaining each planet.
- 3. Blow up the balloons that will represent each planet.
- 4. Look at the picture below and decorate each planet with the correct colors.
- 5. Cut out a circle from the paper plate and use this around Saturn.
- 6. Tie all the balloons in the correct order to the string or ribbon and hang it up in the classroom.



#### Learning goals

Describe some principles of celestial mechanics.

#### Standard

Identify the characteristics of the elements that make up the Solar system.

#### Content

- The lunar eclipse
- The solar eclipse



## Key Language

**lunar eclipse.** When the Moon is darkened as it passes into Earth's shadow.

**solar eclipse.** When the Sun is obscured by the Moon.

**Moon.** The natural satellite of the Earth, visible by reflected light from the Sun.



## Science and Technology

 Ask students to watch the video about eclipses.



 Students draw a diagram of the two eclipses showing how they work.



## **Complementary Activities**

#### Warm-up

• When introducing the topic, ask students what is the Moon is and why it is important to us? Ask students why the Moon changes so much.

- In pairs, students create a moon phases poster. Students first draw the Earth in the middle, using color and accuracy. They then draw the different phases of the Moon using labels, around the Earth. The phases should create a circle around the Earth.
- As a class, students play "Hangman." The teacher chooses a word related to the Moon and the eclipses. Students get a chance to choose letters. If the letter is correct it goes into the open spaces. If it is incorrect, the little man starts being drawn. If the man is drawn completely, the word must change. If the word is complete, the student who guessed correctly gets a chance to choose a word of their own.
- Advanced students can create a lunar timeline. Students record the lunar cycle for a month using drawings and words. Students present their research to the class.
- At the end of the lesson, ask: What are the shapes of the Moon called? How often does the Moon change phases? How often does a lunar or solar eclipse happen?





#### Learning goals

Describe the movements of the Earth.

#### **Standard**

Identify the characteristics of the elements that make up the Solar system.

#### Content

- Dav and night
- The different seasons
- What causes the seasons
- Two parts of the world
- Tropical, dry, and wet zones



## **Key Language**

winter. The coldest season of the year.

**spring.** The season after winter, when plants start to reappear.

**summer.** The warmest season of the year.



## Science and Technology

 Ask students to watch the video about the movement of the Earth.



Students discuss the movement of the Farth.



## **Complementary Activities**

#### Warm-up

• When introducing the topic, ask students to recall the difference between daytime and nighttime and what activities they do in each.

- Show a basic cartoon strip outline to the students on the whiteboard, a simple 4 x 2 squares on a blank page. Explain to students how to draw a cartoon strip about the seasons, showing them how to do speech or information bubbles. Students should write information about the seasons and be creative telling a story about the seasons.
- Have students do a survey to each other about the activities they do in the day or nighttime. Model an example survey on the whiteboard and give students some key phrases to copy from the whiteboard onto their survey.
- Advanced students can research the equator, tropic of Cancer, and tropic of Capricorn lines and what they represent.
- At the end of the lesson, ask: What is the difference between daytime and nighttime? What climate does Honduras have? What are the four seasons? What is the current season in Honduras?



## Lesson 33 The Moon and the Eclipses



Warm-up

The **Moon** is a lot different from Farth. It is made out of rock and moves around the Earth. The Moon changes shapes because the Sun shines on the Moon, and there is always a side the Sun cannot reach.

Circle the shape of last night's Moon. O.A.







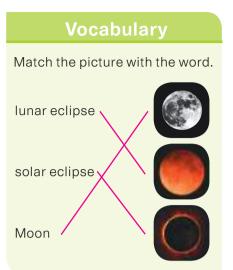
First Quarter



Full Moon



Waning Crescent



Learning

We see that the Moon shines. But the Moon does not have any light of its own. We see it bright in the sky because it is reflecting the Sun's light.

Think about it... What happens when there is a lunar eclipse?



The Earth is between the Moon and the Sun.



A lunar eclipse happens when the Earth is between the Moon and the Sun.

The sunlight is being blocked by Earth, so the Moon is in the Sun's shadow.

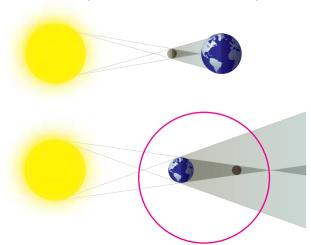
The Moon is not completely dark when this happens, and it is a brownish or red color.

A lunar eclipse can only happen when the Moon is full.

At this time the Sun, Earth and the Moon are at exactly the same place.

**Application** 

Circle the picture of the lunar eclipse.



## Why is the Moon Important?

The Moon is the brightest and biggest object in the sky at night. It makes Earth a better place to live on by helping Earth rotate on its axis. This makes the climate be more stable. It also causes tides in the ocean, which help to create a rhythm that guides us.

## The Solar Eclipse

A solar eclipse happens when the Moon moves in front of the Sun.

Lunar eclipse - twice every three vears

Solar eclipse - twice per calendar year



Do you know how often a lunar or solar eclipse happens?

When the Moon does this, some parts of the Earth will have shadows.

This type of eclipse is not visible everywhere, only in the parts of Earth where there is a shadow.

It seems like the Sun has gone dark.

Even though it gets darker, you should not look directly at the Sun because this will hurt your eyes.

## **Application**

 Match the description to the correct word.









When the Farth is between the Sun and the Moon.

When the Moon is a brown or red color.

When the Sun gets covered by the Moon.

There has to be a Full Moon.



## **Game Time!**

## **Hunting for Moon Rocks**

#### You will need

Chocolate eggs or any ball shaped candy, plastic ball capsules, aluminum foil, prizes (any small toy that will fit into the plastic capsule)



#### Instructions

- 1. Wrap the chocolate eggs with aluminum foil.
- 2. Put the small toys inside the plastic capsule and wrap them with foil as well.
- 3. Your teacher will then go hide all the Moon rocks outside on the playground.
- 4. Once all the rocks are hidden, you can go outside and see how many Moon rocks you can find. Have fun!

## Lesson 34 Earth's Movements and Seasons



## Warm-up

The link between the Earth. Sun and Moon causes day and night as well as the changing of seasons. When the Earth turns, it causes day and night and the seasons. When do you go to school, in the day or night? Write daytime and nighttime and then circle the picture of when you go to school.



Daytime



Nighttime



## Learning

## Day and Night

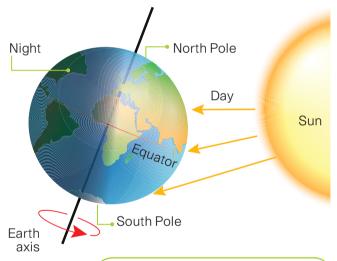
Day and night happen because the Earth turns on its own axis. It's called rotation.

in Honduras, it means that part of Earth is facing the Sun.

When the planet has turned away from the Sun, it is nighttime on that part.

One time around the axis of the Earth takes 24 hours, which is one day.

When it's daytime



## **Application**

Write the words from the box for each picture.

Sleeping Sun Stars Warm Awake Moon



Stars



Sleeping



Sun



Warm



Awake





Moon



## Critical Thinking

What would happen if Earth didn't turn around on an axis?

There wouldn't be night or day because the Earth would never be facing toward or away from the Sun.

#### The Different Seasons

# Think about it... Name the four seasons.



The four seasons are **summer**, fall, **winter**, and **spring**. All seasons are about three months long.



In spring, flowers bloom again, plants grow, and animals come out. It gets warmer. Summer is the warmest of the four seasons. It is the time to swim and play outside.

During fall the weather gets colder. The leaves change color and fall to the ground.

Winter is when it's much colder. It starts to rain, and the days are much shorter. It can snow.

## **Application**

• Match the correct description with the correct picture by writing the correct letter.



**A)** The leaves turn brown or orange and start to fall off.



**B)** The warmest season where you can swim and play.



**C)** The flowers and plants start to grow again.



**D)** The coldest season when it rains or snows.

#### Learning

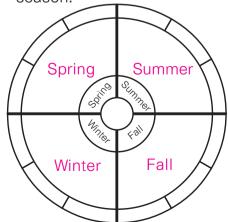
## What Causes the Seasons?

There are different seasons because of the Earth's relationship to the Sun. The Earth going around the Sun is called an orbit, and it lasts for 365 days (1 year). As the Earth orbits the Sun, the amount of sunlight each location on the planet gets every day changes slightly.

Summer Sun Winter

## Application

Draw a picture to match each season.



#### Two Parts of the World

# Think about it... What is the function of the line in the middle of the world?

It divides the Earth into the southern and northern hemisphere.

The world is divided horizontally into two parts by an imaginary line called the equator.

#### **Southern Hemisphere**

The southern hemisphere is the bottom part of the Earth.

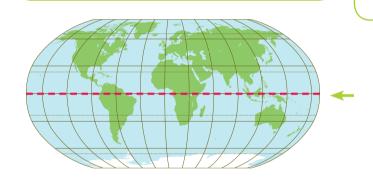
Countries that are part of the southern hemisphere are countries in most of South America, some African countries, Australia, and New Zealand.

Winter starts in June and goes on to August. Spring will be from September to November. Summer is from December to February, and fall is from March until May.

## **Northern Hemisphere**

The northern hemisphere is the top part of the Earth.

Countries that are in the northern hemisphere are the United Stated of America, countries in Europe, Canada, Russia, and most parts of Asia. In the northern hemisphere, winter is from December to February. Spring starts in March and lasts until May. Summer is from June to August, and fall will be from September until November.



The imaginary line that divides the Earth in two horizontal halves is called the equator.

## **Application**

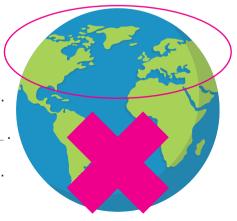
• Fill in the missing word, from the word box.

Australia September June March bottom February May

- 1. The southern hemisphere is part of the <u>bottom</u> of the Farth.
- 2. Australia is part of the southern hemisphere.
- 3. Winter starts in \_\_\_\_\_ in the southern hemisphere.
- 4. In the southern hemisphere, spring starts in <u>September</u>
- 5. Summer ends in <u>February</u> in the southern hemisphere.
- 6. Fall is from <u>March</u> until <u>May</u> in the south.

## **Application**

 Circle the northern hemisphere, and make an X over the southern hemisphere.



## Tropical, Dry, and Wet Zones

#### Where?

The tropical zone is all the places that are on and near the equator. The places that have a tropical climate are the Amazon Basin in Brazil, West Africa's Congo Basin and the rainforests of Malaysia and Indonesia.

#### Temperature?

In a tropical zone, the temperature is very high all year long as if it were summer, but also rains almost every day. Even though it rains, it is still warm. Thunderstorms are also common in a tropical zone.

#### Seasons?

Tropical zones have two seasons: rainy and dry. These last about six months each. Honduras' rainv season is from Mav until almost November and the rest of the year is dry season.

## **Application**

 In your own words, describe the weather of a tropical zone.

n	а	tropica	Izone.	it is	verv	warm	and

it rains every day. Thunderstorms

happen almost every day.

## **Application**

 Cross out the places that have a tropical climate.

Japan	Amazon Basin	

China Canada



Indonesia Germany



# Hands on!

## **Day and Night**

## Teacher will need

Globe, flashlight and a dark room

#### Instructions

- 1. Teacher gathers all the students in a dark room.
- 2. Put the globe where everyone can see it.
- 3. Have the flashlight ready.
- 4. Turn off the light so that it is completely dark.
- 5. Spin the Earth and hold the flashlight to the one side of the globe. **Explanation:** The flashlight represents the Sun, and the side of the Earth where the flashlight is shining will be where it is daytime. The other side where it is not shining will be nighttime.



# Lesson 35



#### Learning goals

Acquire basic concepts necessary to define matter.

#### Standard

Identify changes in states of matter.

#### Content

- Stages of water
- Changes in the state of matter
- Properties of matter: mass and volume
- State of matter: solid, liquid, gas
- State of matter: plasma and Bose-Einstein condensate



#### **Key Language**

**vaporization.** A compound transitioning from the liquid phase to vapor.

**condensation.** Water which collects as droplets on a cold surface when humid air comes into contact with it.

**molecules.** A group of atoms that are bonded together.



# Science and Technology

 Ask students to watch the video about the changes in water.



 Students can play a game of Hangman with key vocabulary from the video



# **Complementary Activities**

#### Warm-up

• When introducing the topic, ask students to touch different things in the class and ask them if they are matter. Ask the students to give some of their own examples of matter. Have a class discussion on what the students think is matter.

#### **Learning and Application**

- Prepare various words that can represent solids, liquids, or gases. Stick the words around the classroom. Have students draw three columns on a blank page and label the columns solid, liquid, and gas. Ask students to do a scavenger hunt to find what items are a solid, liquid, or gas and write them in the respective columns.
- Create a song or rhyme about the stages of matter. Encourage students to use keywords from the lesson by writing the words on the whiteboard. Ask the students to present and perform their song to the class.
- Advanced students can research the reverse process of turning a gas to a liquid and a liquid to a solid.
- At the end of the lesson, ask: What are the stages of matter? How do we change water from a solid to a liquid? What is the difference between mass and volume?



# Lesson 36



#### Learning goals

Recognize different energy sources and their application.

#### **Standard**

Describe energy sources and their application in machines and work.

#### Content

- Different forms of energy
- Sources of energy: renewable and non-renewable
- What is electricity
- How do we make electrons move to make electricity
- Safety Tips



#### Key Language

**renewable energy.** Energy from a source that isn't depleted.

**electricity.** A type of energy that comes from the existence of charged particles.

**non-renewable energy.** Energy from a source that cannot easily be replaced.



#### Science and Technology

 Ask students to watch the video about renewable and nonrenewable resources.



 Students design a pamphlet showing the difference between renewable and non-renewable energy.



# **Complementary Activities**

#### Warm-up

• When introducing the topic, ask students how they think the lights in the classroom work and where the power comes from to have them light up. Have a class discussion about where the electricity comes from and how electricity is generated.

#### **Learning and Application**

- Have students individually make a timeline of all the items they use in the day that
  use electricity. Model the timeline on the whiteboard with the times of the day and
  examples of machines used, such as the kettle, fridge, car etc.
- Go outside into the schoolyard and play a game of "Simon Says" to show the students that our bodies also use energy. Shout out actions for the students to do such as "Simon says Run!" Use a student to monitor and switch roles for a student to give the instructions too.
- Advanced students can research how they can use renewable energy at home.
- At the end of the lesson, ask: What are different forms of energy? What is electricity? What are sources of energy? What's the difference between renewable and non-renewable energy?



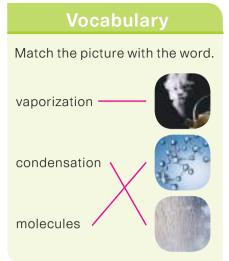


Matter is made up of atoms and molecules. Millions of these tiny objects group together to form bigger things, like animals, plants, or cars. Matter is the water we drink, the air we breathe, and the chair we are sitting on.

Make an X on the things that were mentioned above.









#### States of Water

Think about it...
What are the states of water?



Liquid, solid, and gas.

Water can come in different states. When it comes out of the tap, it is in liquid form. Depending on what we do with it, the state can change to solid or gas.

Solid water Liquid water Gas water



This is called ice. This water has the lowest energy and temperature. When water is solid, the **molecules** are held tightly together and don't move easily.



This is normal water. As ice becomes warmer, the state will become liquid water. Liquid molecules are looser and can move more easily.



This is called steam or vapor. When water boils, it will turn to vapor. These molecules are hotter, looser, and move faster than liquid molecules. They are spread apart and can be compressed.

#### Did you know?

When temperature rises, it means it is hot. And when it falls, it means it is cold.



#### **Application**

Write solid, liquid, or gas under each picture.













Solid

Gas

Liquid

Solid

Liquid

Gas

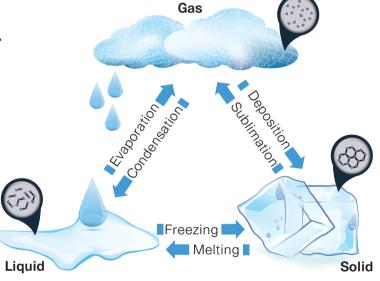


# **Changes in the State of Matter**

When the temperature rises, the ice turns into water, and the water turns into vapor.

When the temperature falls, the gas turns to water, and the water turns to ice.

Study the diagram to understand the process of the state of water when the temperature changes.



# **Application**

Complete the sentence by using a word from the box.

boiling point condensation
melting point Freezing point boils

- When solid water melts, it's called <u>melting point</u>.
- 2. Freezing point is when liquid becomes solid.
- 3. Liquid becomes a gas when water \_\_\_\_\_boils
- 4. When the liquid reaches <u>boiling point</u>, the molecules break free and become a gas.
- 5. The opposite is when a gas becomes a liquid and this is called <u>condensation</u>.

# Learning

# **Properties of Matter: Mass**

Mass is the amount of matter in something. There can be a small object with a lot of mass, like a statue made of lead. It can also be a large object with very little mass, such as a balloon filled with helium. There is a difference between mass and weight. Mass is a measure of the matter in an object while weight is a measure of gravity's pull on an object.

### **Application**

• Which object is lighter or heavier? Add the words to the correct category.

Paper	1
Crayon	
Table	
Pencil	
Bench	
Teacher	

Heavier	Lighter
Table	Paper
Bench	Crayon
Teacher	Pencil



# **Critical Thinking**

If we had no mass, how would we stay on the ground?

A lack of gravitational pull on things with mass would cause them to become fast-moving tumbleweeds.

Think about it... What is the difference between mass and volume?



#### Learning

#### **Properties of Matter: Volume**

Volume is the amount of space something takes up. Words like big, little, long, or short can describe volume. A marble has a small volume and a star occupies a lot of space. Different states of matter will fill volumes in different ways.



**Application** 

 Write solid. liquid, or gas for each picture.



Gas

# **Application**

Mass is the amount of matter of an object and volume is the amount of space of something.

 Circle the picture that shows the most volume.





# Learning

# State of matter: Solid, Liquid, Gas

Matter usually exists in one of three states or phases: solid, liquid and gas. The atoms and molecules don't change, but the way they move around does. A solid can keep its shape. It cannot be stretched easily. A liquid, like water, can flow and has no shape of its own. But it can't be stretched or squeezed. A gas can flow, expand and be squeezed.







Solid

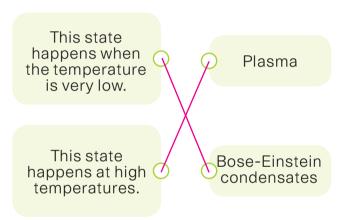
#### State of Matter: Plasma and Bone-Einstein Condensate

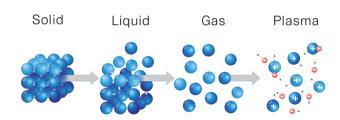
There are two more states that matter can take, but we don't see these so often in our everyday life.

Plasma occurs at high temperatures and can be found in stars and lightning bolts. Plasma is almost like gas. The other state is called Bose-Einstein condensates. This state can occur at very low temperatures.

#### **Application**

Match the description to the correct state.





#### Conclusion

 Complete the experiment below and circle the correct conclusion.

The water did not turn to a solid because of the decrease in temperature. When the temperature of water is decreased, it changes to a solid.



# Be a Scientist

#### States of Matter

#### You will need

Your teacher, water, kettle, bowl, fridge

# Steps

- 1. Work in groups of 4 or 5.
- 2. Boil water (liquid).
- 3. Watch as water turns into steam (gas).
- 4. Mix in the Jell-O crystals (solid).
- 5. Place in the fridge to remove the heat and cool the gelatin.
- 6. Removing the heat turns the liquid into a solid.



# Lesson 36 Energy



The simplest definition of energy is "the ability to do work." Energy is how things change and move. It's everywhere around us and takes all sorts of forms. It takes energy to cook food, to drive to school, and to jump in the air.

Look at each activity and mark an X next to the picture that shows when you use more energy.









Match the picture with the word.

renewable energy

electricity

Did you know? There are many different

forms of energy.

non-renewable energy



Learning

# **Different Forms of Energy**



#### **Electrical Energy**

Movements of electrons, for example, lightning and batteries.



# **Heat Energy**

Molecules of different temperatures that interact with each other, like the Sun.



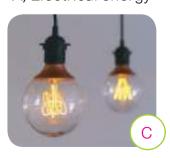
#### **Light Energy**

Electromagnetic radiation. It is also called radiant energy, for example, fire.



Match the picture with the form of energy.

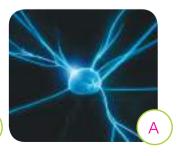
A) Electrical energy



B) Heat energy



C) Light energy



#### Law of Conservation of Energy

This law states that energy is never created or destroyed; it is only changed from one state to another.

Energy that can replenish itself and not be used up.

# **Sources of Energy: Renewable**

# Think about it... What is renewable energy?



Renewable energy uses energy sources that are not "used up", they continue to exist.

Examples are solar (from the Sun), wind, water, geothermal (from the Earth) and biomass (from organic materials).

Solar power from the Sun is renewable because we won't "use up" all the sunlight from the Sun.



Many renewable energy sources are also better for the environment than burning fossil fuels.

# Critical Thinking

What happens if our natural resources are used up?

Life on Earth would not be able to continue because we would not have resources to sustain our way of life.

### **Application**

Fill in the missing words from the word box.

wind Renewable sunlight solar environment

- 1. Renewable energy uses sources that are not used up.
- 2. The energy that comes from the sun is called solar
- 3. The Earth gives us <u>wind</u> and water energy.
- 4. We cannot use up sunlight .
- 5. Using renewable energy is better for the environment



#### Learning

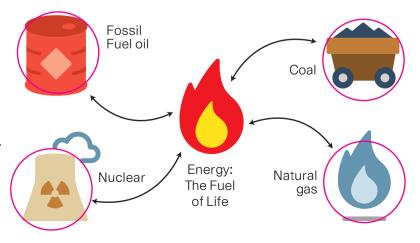
# Sources of Energy: Non-renewable

As humans, we use a lot of energy to drive our cars, heat and cool our houses, watch TV, and more.

Non-renewable energy uses up resources that we cannot recreate. An example is the gas to run our car. Other sources that cannot be recreated are coal, natural gas, crude oil, and uranium.

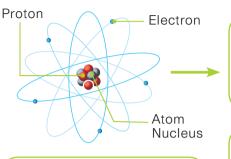
# **Application**

• Circle the Non-renewable energies.



# What Is Electricity?

Before we can understand **electricity**, we need to learn more about atoms.



Atoms are made out of small particles, and you need billions of atoms to make one pencil.

Inside an atom there are electrons, protons and neutrons.

Electricity is when electrons flow.

Electricity is when two or more atoms are together and the electrons move between the atoms.

The electrons in the atom are where electricity's name comes from.

# Application

Shortly explain what electricity is.

Electricity is when electrons flow.

When two or more electrons move

from one atom to another, that is when

electricity is formed.

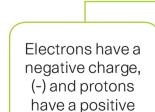
#### Did you know?

A bird can sit on one electric line. The moment it touches more than one line at a time, it would be shocked. This is called electrocution.



# Learning

# How Do We Make Electrons Move to Make Electricity?



charge (+).

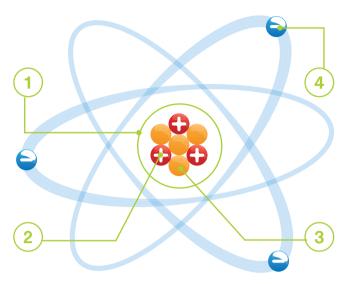
Protons and neutrons stick to together in the center of the atom, called the nucleus.

The electrons spin fast, and the positive charge of the protons keeps the electrons from flying off and leaving the atom.

When a force is applied, it can come loose and move to another atom. This is how electricity is made.

#### **Application**

Name the parts of an atom.



Learning

#### **Safety Tips**

You should not play with electricity. When you do work with electricity, ask your parent or and adult to help you. Never stick your finger into a wall outlet. Never put electronic things into the water, especially if they are plugged in. This could shock you.



 Cross out what you should not do with electricity.

Play with electricity.



Throw water on electronic things.



Don't use electricity without an adult.

Use electricity to make light.





Nucleus

Proton

Neutron

Electron

# **Static Electricity**

#### You will need

Empty soda can, inflated balloon, head of hair.

#### Instructions

- 1. Place the can on its side on a flat smooth surface like a table or a smooth floor.
- 2. Rub the inflated balloon back and forth through your hair really fast.
- 3. Now the fun part Hold the balloon close to the can without actually touching the can. The can will start to roll towards the balloon without you even touching it.

You can even take a piece of tape to make a finish line and hold a race to see whose soda can wins!

# Lesson 37



#### Learning goals

Identify, define, and describe levers, wheels, inclined planes, and pulleys.

#### **Standard**

 Describe some characteristics of simple and compound machines, mentioning their usefulness.

#### Content

- What are machines
- Lever
- Wheel and axle
- Inclined plane
- Wedge
- Pulley

- Screw
- Compound machines



#### **Key Language**

**groove.** A long, narrow cut in a hard material.

**compound machines.** A machine that consists of two or more simple machines put together.

circular. Having the form of a circle.



# Science and Technology

 Ask students to watch the video about simple machines.



 Students can present a role-play about using machines in our daily lives.



# **Complementary Activities**

#### Warm-up

When introducing the topic, ask students what they think machines are and how they work?

#### **Learning and Application**

- The students can individually create their own booklet of compound machines.
   Ensure that the students state what simple machines make up the compound machine. In the student booklet, they should have a drawing of the compound machine, what simple machines make it up, and the use of the machine.
- Prepare a group presentation about machines that they use daily, including what its functions are and how it was developed.
- Advanced students can research modern simple machines that they use daily. Ask students to present their findings to the class.
- At the end of the lesson, ask: What are machines? What is the use of a lever, wheel and axle, or wedge? What are compound machines?



# Lesson 38



#### Learning goals

- Value local crops as part of their life and the main source of food in their life.
- Promote the practice of the variety of local and non-local crops in orchids and plots.

#### **Standard**

• Identify the processes through which humans make use of technology applied to the production of local crops and treatment of solid waste.

#### Content

- Agriculture in Honduras
- Difficulties in farming

- Improvement of production
- Technology in local crops



#### **Key Language**

**livestock.** Farm animals that are regarded as an asset.

**horticulture.** The practice of garden cultivation and management.

**shrimp.** A small shellfish with an elongated body, used as commercial food.



# Science and Technology

 Ask students to watch the video about the history of farming technology.



 Ask students to take down notes while watching the video. Do a pop quiz about the information from the video.



# **Complementary Activities**

#### Warm-up

• When introducing the topic, ask students if they know what crops are mostly grown in Honduras. Have a class discussion about what is considered as local crops in the area.

#### **Learning and Application**

- Place students into groups of 4 to 5. Give each group a crop that is grown in the country. Have students research information and facts about the crop they were given and then have a mini-debate about what crop they think is the most important, remembering to state their reasons for saying that.
- Play a game of "Crop Bingo." Have students draw up their own Bingo cards and insert the words into the squares. Write up the keywords on the board for students to use on the Bingo card. Then, draw and say the words until there is a winner.
- Advanced students can design a plan of how Honduran farmers can use modern technology to help with farming.
- At the end of the lesson, ask: What are some difficulties in farming? How has production improved? How can technology help agriculture?



# **Lesson 37** Machines



From the moment you wake up in the morning until you go to bed, you use many things that make your life easier.

Can you think of a few things and how they help you?

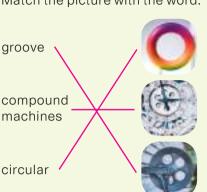
Write down things you have used from this morning until now that made your life easier.

O.A.





Match the picture with the word.





#### What Are Machines?

Think about it... What are machines?



Things that we use to make our lives easier.

Simple machines are devices with very few or no, moving parts.

**Machines** 

Machines make work easier for us. It can be defined as the simplest mechanisms that use mechanical advantage to multiply force.

The force that you get out is much greater than the force you put in.

A lot of today's machines are just combinations of simple machines.

# Learning

There are different machines that make our life easier.

#### Lever

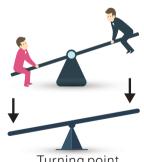
A lever consists of a bar of some kind and a pivot. By applying force to one end of the bar, the bar will pivot and that causes a magnification of the force at another point.

There are three types of levers, depending on where the input force is:

First class is where the turning point is in the middle.

Second class is where the weight is in the middle.

Third class is where the force is in the middle.



Turning point





# **Application**

• Explain how using simple machines can make your daily life easier.

The force we put in multiplies. This means we do not have to

work as hard to get the work done.

# Learning

#### Think about it... What other machines are there that make our life easier?



Wheel and Axle



Vacuum cleaner, bicycle, car, train, computer, etc.

This is a simple machine that consists of a circular device that is attached to a rigid bar in its center.

When a force is applied to the wheel, it forces the axle to rotate. This is when the force is magnified.

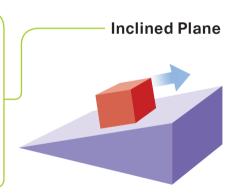
It is normally used to move loads.

Examples: Watermill, office chair, and toy car.

An inclined plane is a flat surface that is attached on an angle to another place. It is used to slide heavy things over a surface or to lift them and place it on something, like a truck.

An inclined plane is also seen as a ramp. It requires less force to move up a ramp to a higher place than it is to climb that height vertically.

Examples: Ramp for movers and slides.



# **Application**

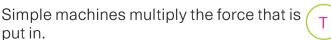
Write T for true and F for false.

Simple machines make our life difficult.



There are six different simple machines.

The turning point of a first-class lever is in the middle.



It is easier to move objects vertically than to use an inclined plane.



# **Application**

 Circle the pictures that make our life easier.



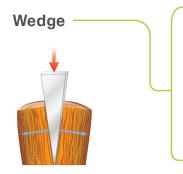












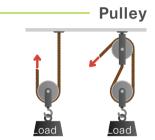
The wedge is often considered a double inclined plane (both sides are inclined), that moves to exert a force along the lengths of the sides.

The main function of a wedge is to change the direction of the input force.

Example: Axe chopping wood.

A pulley is a wheel with a **groove** along its edge, where a rope or cable can be placed in. We normally use it to lift very heavy objects.

Examples: Flagpole, the blinds in front of a window, and garage door.





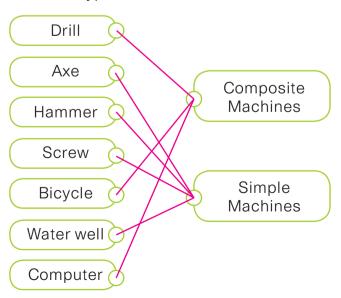


A screw is a shaft that has an inclined groove along its surface. When you are rotating the screw, the force is applied to the groove. It is being used to put things together.

Example: Putting two pieces of wood together for a table.

# **Application**

 Match the kind of machinery to the correct type of machine.



#### Did you know?

Your bicycle uses of almost every kind of simple machine.



# **Application**

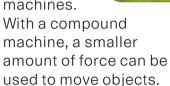
 Name four simple machines that you use in your daily life.

O.A.			

# **Compound Machines**

Machines save effort and time by making our work lighter. **Compound machines** are made by combining two or more simple machines.

Most of the machines in the world are compound machines.



The reason for the less force is that the compound machines

multiply the force, whereas simple machines usually cannot do it. Compound machines work together to achieve a result.

**Critical Thinking** 

How would factories produce things if they didn't have machines to help them?

They would have to use people (manual labor) and it would take much longer to produce things.

> For example bicycles. Pedals and wheels form a wheel and axle system, brakes are levers, and parts are held together by screws.

#### **Application**

 Draw a picture of a machine that you use in your daily life and explain how it helps you.



# Hands on!

# Make your Own Pulley

#### You will need

2 pencils, 2 empty thread spools, binder clips, string, small snack

#### Instructions

- 1. Make a large loop by tying together the ends of the string. Put the pencils through the middle of each spool.
- 2. Give one spool to your friend, and work together so that each spool has one end of the loop wrapped around it.
- 3. Move to opposite sides of the room until the loop of string is pulled tightly. Hold the pencil parallel to the floor and use the binder clip to secure the snack to the bottom of the loop. snack to the bottom of the loop.
- 4. You can send your snack to your friend by pulling the loop towards you.

O.A.

# Lesson 38 Local Crops



The soil in Honduras is in perfect condition for agricultural production. Honduras also has a variety of microclimates allowing different forms of production. In pairs, name five local crops planted by farmers.

Write the word for each picture.



Rice

Honduras's production fields for crops are located near demanding

countries. A considerable amount of land is underutilized or cultivated in



Learning

Coffee

#### **Agriculture in Honduras**

Think about it... Why is agriculture important in Honduras?

Corn



Because two-thirds of the population work in agriculture and the people depend on it for their livelihoods.

There are different methods to cultivate the land: horticulture, which is based on growing a diversity of species in a food garden, and agriculture, which involves cropping one or two species in

large areas of land.

traditional ways, which could be improved.

After the manufacturing industry, agriculture and livestock are the next most important industries for the economy of the country. Other crops of Honduras are **shrimp** in the south and tilapia in the small farms at the national level.

An estimated that two-thirds of the Honduran population works in agriculture.

# **Application**

 Define the following words. Then answer the question.

Horticulture:

Growing a diversity of species in a food garden.

Agriculture:

Cropping species in large areas of land.

What are the three main sources of income of Honduras?

Manufacturing industry, agriculture and livestock.

Corn. coffee. beans, rice, bananas, sugar cane, etc.

The most important crops are corn, coffee, beans, and rice. These products are the typical foods consumed by the people of the country.

To meet the domestic demand. vegetables such as potato. chayote, carrot, beet, and lettuce are grown. A great number of flowers are also grown.

Learning

#### Difficulties in Farming

Despite the support of institutions and various efforts, there have been adverse factors in the national production.

- Only 26% of Honduran territory is used in agriculture.
- Burning and monoculture have deteriorated the soil.
- Climate changes have caused droughts and floods.







Agriculture production



Monocultures burned

#### Think about it...

What crops does Honduras produce?



Most **Important** Crops

Every year, the country exports coffee, bananas, sugar cane, and palm oil. Honduras also exports fruits like citrus, melon, watermelon, mango, and chili.



# **Critical Thinking**

The soil in Honduras is very good to grow several different crops, both for local and export. Why is it good for export?

Exporting goods means the country gets an economic boost and capital from other countries.

### **People Leave the Country**

There are different reasons why people leave the country.



# **Application**

Put an X next to the things that can be done to overcome the difficulties in farming.

Cultivate more land to improve production.



Do not burn monocultures in order to protect the soil.



Educate people about better farming techniques to improve productivity.



Plant different crops that fit the environmental climate.



# **Improvement of Production**

Agricultural production needs to improve for two reasons:

#### Did you know?

Each year an estimated 75,000 Hondurans leave the country to find a job in another nation.



- To raise the amount of products to be sold, and improve the family income.
- Meet high quality standards to be more competitive and create better products.

Because the population on the planet is growing quickly, producing food is an international concern. There are many organizations to ensure the improvement of the country's production.

#### **SICTA**

Sistema de Integración Centroamericana de Tecnología Agrícola (SICTA) develops projects to improve the production in Honduras.

#### **SENASA**

Servicio Nacional de Sanidad Agropecuaria (SENASA) ensures sanitation and the quality of agricultural, fisheries, and forestry production of Honduras.

#### **FHIA**

Fundación Hondureña de Investigación Agrícola (FHIA) trains people in crop techniques to control the harvesting of vegetables.

#### **EL ZAMORANO**

The Pan-American Agricultural School El Zamorano participates in the improvement of agricultural projects.

# **Application**

Match the institution with the description.

SICTA FHIA SENASA EL ZAMORANO

Ensuring

Improvement of agricultural projects

Improvement of production

Training people in crop techniques

Ensuring sanitation and quality of agricultural production



#### **Technology in Local Crops**

- More than 16% of the national territory is agriculturally productive. Because of the uneconomical system of land use, much arable land has not been exploited or farmed.
- Agriculture is one of the main sectors of the economy. Ways of farming are inefficient, and crop yields and qualities are very low. With the right systems in place, the land can be optimized and better used, and farmers can be more productive.





- There are no advanced technologies and equipment for the Honduran farmer; the equipment and way of farming is how their ancestors did it.
- The use of modern technology, like the use of modern machines to improve speed of production and harvesting, will allow farmers to produce more for local use and feed the people of Honduras. But more importantly, it will improve the quality for export at a much higher standard, and the farmer can get more money for his produce, allowing a boost to the economy.



### Be a Scientist

# **Germinating Beans**

#### You will need

A small plastic container with a lid, two pieces of cotton wool, two beans and some water.

# **Steps**

- 1. Place one piece of cotton wool at the bottom of the container.
- 2. Place the two beans on the piece of cotton wool.
- 3. Place the second piece of cotton wool on top of the two beans, covering both beans.
- 4. Drip some of the water on the cotton wool so that both pieces of cotton wool are wet.
- 5. Place the container near a window.
- 6. Observe for the next few days. Remember to water your beans every day!

Application
-------------

What happened after two days?

O.A.

What happened after a week?

O.A.

What did you learn?

 $\cap \Delta$ 



# Lesson 39



#### Learning goals

- Practice the basic rules of personal and environmental hygiene, transmitting its principles to other members of the community.
- Conceptually relate the state of the environment and the incidence of diseases and accidents in their daily life.

#### Standard

• Identify the processes through which humans make use of technology applied to the production of local crops and treatment of solid waste.

#### Content

- Organic and inorganic waste
- Four rules of waste management
- Importance of recycling

 Relationship of soil waste management with the environment



#### Key Language

**organic.** Something that is derived from living matter.

**chemical.** Relating to chemistry and the interaction of substances.

**biodegradable.** Having the ability to be decomposed by bacteria and avoiding pollution.



# Science and Technology

 Ask students to watch the video about separating waste.



 Students can create a table to show examples of organic and inorganic waste.



# **Complementary Activities**

#### Warm-up

• When introducing the topic, ask students to think about where trash goes. Have a class discussion about waste management.

#### **Learning and Application**

- Go outside and have a schoolyard clean-up. Record all the trash that is picked up and state if it is plastic, metal, etc. Ask students to present their findings after the clean-up and also discuss what they think of the waste they found and how it can better be discarded.
- Design your own boardgame. Give students a blank boardgame and have them fill it in with the keywords, pictures, or phrases for the game. Write up some examples on the whiteboard for students to follow. Once they have completed filling in the boardgame, give students dice and counters to play their game.
- Advanced students can create a slogan about recycling to help keep the school clean.
- At the end of the lesson, ask: What is organic and inorganic waste? What are the four rules of waste management? Why is recycling important?



# Lesson 40



#### Learning goals

 Practice environmental education, transmitting its principles to other members of the community.

#### **Standard**

• Identify the processes through which humans make use of technology applied to the production of local crops and treatment of solid waste.

#### Content

- What is recycling
- Paper recycling
- Biomaterials



#### Key Language

landfill. The disposal of waste material by burying it underground.

**recycle.** Converting or reusing waste, or returning it to a previous state.

**process.** A series of actions or steps taken to accomplish a goal.



# Science and Technology

 Ask students to watch the video about the recycling process of various materials.



 Students draw the process of recycling materials, such as metal or plastic.



# **Complementary Activities**

#### Warm-up

• When introducing the topic, ask students to think about recycling in their homes. Share with the class how they and their family recycle.

#### **Learning and Application**

- Divide students into groups of 2 to 3. Design and create a poster to put up in the school to raise awareness on the importance of recycling in school and at home.
- Pair up students and play a game of "Pictionary." In pairs, students draw various items, and their partner needs to guess what the item is and also what recycling trashcan it should go to, like metal, plastic, etc.
- Advanced students can keep a journal of their own home's waste and waste management system. They can share with the class what happens in their home.
- At the end of the lesson, ask: What is recycling? What is the process of paper recycling? What are biomaterials? Why is it important to recycle at home?



# Lesson 39 Solid Waste Management



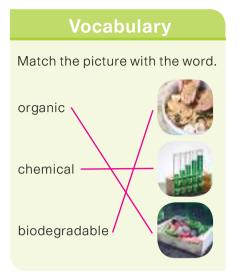


What did you eat as a snack during recess? Did you perhaps have a bag of chips?

Maybe you had cereal with milk this morning. What do you do with the empty milk container?

Write down a few things that you can do with an empty milk container.

Water plants, store cold water in the fridge. Any relevant answer.



#### Learning

#### **Organic and Inorganic Waste**

#### Think about it...

Can you name some things that can be classified as organic waste?



Fruit, vegetables, foliage, animals, etc.

Organic waste is classified as any material that is **biodegradable** or that comes from either a plant or an animal.

Organisms break it down into smaller pieces.

It can be broken into carbon dioxide or simple molecules.



**Organic** waste



Inorganic waste is waste that is only slightly affected by organisms or not at all.

It causes pollution because it cannot be broken down.

It is **chemical** waste with chemical substances of mineral origin.

# **Application**

 What is the difference between organic and inorganic waste?

Organic waste comes from nature and can be

broken down, while inorganic waste contains

chemicals and cannot easily be broken down.

# **Critical Thinking**

If we do not stop polluting the Earth with inorganic waste, what will happen?

Our natural resources will be eradicated.

#### **Four Rules of Waste Management**

There are certain ways we can help the Earth. If we follow these four rules, there will be less waste.

Think about it...
How can we help save the planet?



We can reduce, reuse, and recycle our waste.

Reuse: Use materials again rather than throw them away. A water bottle can be used to keep water cold.



Recycle: Glass bottles, paper, tins, metal, and some other materials can be recycled. Material is broken down, and new products are made from the same old material.

Reduce: To reduce is to use less materials that goes to waste. Choose products that can be used again or recycled.





Recover: To recover is the process where waste can be converted into resources, such as electricity, heat, compost, and fuel.

#### **Application**

Write what is good for the Earth and what is not.





Inorganic waste,

littering, non-

renewable waste.

# **Organic Waste Management**

Organic waste management is about fertilizing soil in an organic way until the waste is used.

We use our organic materials, such as plant and animal product leftovers.

We place these things back into the ground. Microorganisms work through it and decompose material.

### **Importance of Recycling**

It is important to recycle for people and the environment.

#### Environmental Importance

Garbage on landfill sites releases chemical and greenhouse gasses.
Recycling reduces pollution.

Waste causes habitats to be destroyed and global warming by deforestation. Making new products uses huge amounts of energy. It takes less energy to recycle materials.

Importance for People

There is no space left for waste.

Making products from raw materials costs more than recycling does. Recycling helps to preserve nature for future generations.

# Think about it... Why is it important to recycle?



**Application** 

To conserve and protect our natural resources.

 Follow each line and see in which bin it goes. Write the name of the recycle bin



Plastic

2) Glass

3) Metal

4 Paper

5 Organic

6 Electric

# Did you know?

Enough plastic bottles are thrown away each year to circle the earth four times.



**Application** 

• Say what each of the following symbols stand for.













# Relationship of Soil Waste Management With the Environment

Waste has a huge impact on the environment. This negative impact can cause waste to rot, which causes bad smells and generates gases.

Organizations, like Greenpeace, work on the issues caused by waste.

The management of waste helps save the environment and makes it safer for us to live here.



Burning waste can generates energy that can be used again. It is seen as a renewable energy source.



# Recycling

#### You will need

Yellow, green, blue, and white paint; three recycle bags, three large boxes with lids, paintbrush

#### Instructions

- 1. Paint each of the three boxes yellow, green and blue including the lids. Allow to dry.
- 2. Once dried, use the white paint to paint "Plastic" on the yellow box, "Paper" on the green box, and "Cans" on the blue box.
- 3. When all the paint is dry, layer the inside of each box with the recycling bag, and put the lid on top.
- 4. With help from your teacher place these boxes around your school in different areas.

# Learning

#### Dependence of Human Beings on the Resources That Are Extracted From the Environment

Humans are dependent on the environment and all the resources it provides us.

Natural resources can only come from nature. When they are finished, they are over. Humans need to protect the resources and make sure the world stays healthy.

# Application

What is waste management?

Waste management is when people try to manage the amount of waste that is being dumped. They try to put certain processes in action to protect the Earth.

# Lesson 40 Recycling and Technology



Warm-up

Recycling and reusing materials that have already been used should be a constant practice to preserve the environment. Paper is used in notebooks we write in at school.

Write some products that are made from recycled paper.

In our kitchens, we use paper towels that are made of

recycled paper.

We use recycled paper in our bathroom as toilet

paper.



# Learning

# What is Recycling?

Recycling is when we convert waste materials into new materials and objects. We can also call it conventional waste. This **process** can save materials and help lower harmful gases.

When we recycle, we keep materials in the recycling loop and out of the landfill.



Think about it... What is recycling?



Waste material is converted into new products.

# **Application**

· Look at the pictures below. They can all be recycled. Think of ways how we can use these products again. Any relevant answer



Toilet paper



Water bottle



Flower vase



Carton organizer box



Flower pots

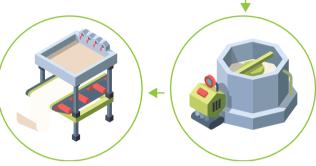
# **Paper Recycling**

Paper is one of the most known materials that we can recycle. We can save trees and forests by recycling paper. Other products are also made from recycled paper.









One ton of recycled paper can save 17 trees, oil, 3 cubic landfill space, 4,000kw energy and 7,000 gallons of water.

Did you know?



#### **Biomaterials**

Biomaterial is any material made to interact with biological systems (with the human body) for medical purposes. It can be therapeutic or diagnostic.

Replacement of diseased or damaged parts: hips and kidney dialysis machines



Healing: bone plates and screws





Improve function: intraocular lens

Aid to treatment: catheters and drains.

Uses of Biomaterial



Correct functional abnormality: cardiac pacemaker



Aid to diagnosis: probes and catheters

Correct cosmetic problem: chin augmentation

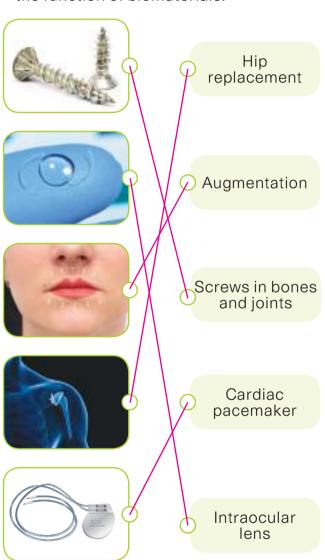


If you injured yourself very badly, and there were no biomaterials, how would you heal and have a full recovery?

Healing would take much longer and in some cases would not be possible.

# **Application**

• Look at the pictures. Match the picture to the function of biomaterials.



# Think about it... What are some uses for biomaterials?



Bone plates, screws, cardiac pacemaker, intraocular lens, catheter, etc.

# Game Time!

#### You will need

Large recycle bin full of aluminum cans

#### Instructions

- 1. Divide into three groups. This game is played one team at a time.
- 2. Each team should have a bin of aluminum cans.
- 3. When the teacher says go, the first team has to stack the cans one on top of each other within 3 minutes.
- 4. Each teammate should have a turn at building the tower.
- 5. The teammate who builds the tallest tower will represent their team in the final match in the team stacking competition. The final game will decide the winner.
- 6. Answer the question below.

Name two things you learned from this game?

First, that we can have fun recycling because we are able to play with recycled items. Second, we can work together as a team. Teamwork is fun and so is recycling.

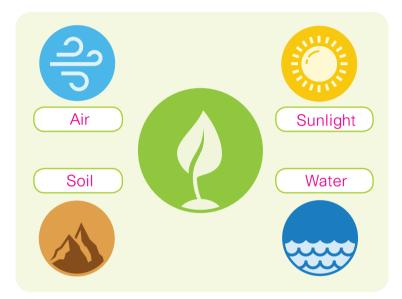
# **Basic Needs of Plants: Rainforest Vegetation**

Plants need sunlight to survive; the thick vegetation of the upper layers of the forest allows little sunlight to reach the rainforest floor. Rainforest plants must either adapt to living with little sunlight under the forest canopy or grow quickly and find ways of reaching the sunlight above the canopy. Let's find out exactly what and how much of it, rainforest plants need to survive.

Before we start, write down the basic needs of plants you have learned before.



Pico Bonito National Park, Honduras



#### Did you know...

Tropical rainforests in
Honduras are home to over
700 species of birds from
colorful toucans to the
national bird, the scarlet
macaw. Jaguars, three
toed sloths, and pumas are
amongst the exotic animal life
which can be seen.



# Research

• Investigate examples of rainforest plants found in Honduras.

# Hypothesis

The basic needs of plants are water, air, sunlight and soil. Do rainforest plants need all four to survive? Read the two statements, and  $\checkmark$  the the answer.

Yes, all plants including rainforest plants need air, sunlight, soil and water to survive.

No, plants are adapted to survive with little sunlight, water, air and soil.

#### **Materials**

- In your group you will need 4 of the same type of rainforest plants of your choice planted in pots with soil.
- A sunny place
- A dark place
- Watering cans
- Paper and markers
- Bean seeds
- Pot or cup and soil

#### **Procedure**

- 1. If possible, divide the class into 4 groups. Each group has a different type of rainforest/regular house plant. Each group will need 4 plants of the same type.
- 2. Each group will also be given bean seeds, a cup and soil to plant their own seeds.
- 3. First, look at the steps of planting a seed and plant your seed. Your seed will receive sunlight, air, water, and soil. Your observations for this part of the experiment should include the stages of the plant. From seed to plant.













- 4. Now, move onto your rainforest plants. In each group, one potted plant will be used as the control plant. The control plant will receive sunlight, water, and soil.
- 5. The rest of the plants will only receive two of the following: water, sunlight, or soil.
- 6. In your group create labels shown below for each plant.









- 7. For the plant without sunlight (**Plant 1**), find a dark place, but remember to still water the plant every second day. Do not remove the soil of this plant.
- 8. For the plant without water (**Plant 2**), find a sunny place and do not remove the soil of this plant. This plant should not receive any water for the duration of the experiment.
- 9. For the plant without soil **(Plant 3)**, remove the soil and place the plant carefully back in the pot. Find a sunny place and remember to water this plant every second day too.
- 10. For the control plant (**Plant 4**), find a sunny place, leave the soil in the pot and remember to water the plant every second day.
- 11. You should take notes of everything you observe. Your observations should include:
  - Color of the leaves
- Length of the stem
- Texture of the soil
- Shape of the plant

### Results

#### Forest Plant Observation

		Da	y 1		Ex	ampl	e: Day	<i>,</i> 4	Ex	ampl	e: Day	7
Plant number	1	2	3	4	1	2	3	4	1	2	3	4
Color of the leaves												
Length of the stem (Cubes can be used)												
Texture of the soil												
Shape of the plant												

### **Analysis**

 Draw pictures to complete the stages of the bean plant using your observations.









Match your observations with the correct plant/plants.
 Student's answers may vary depending on the plant they used.

Which plant/plant's stems showed the least growth?

Which plant/plants leaves changed color?

Plant 1

Which plant/plantle coil toyture was (were the dricet?)

Plant 2

Which plant/plant's soil texture was/were the driest?

Plant 3

Which plant/plants shape changed?

Plant 4

2. Why do you think these changes occurred? Think about what plants get from sunlight, water, and soil.

Student's answers may vary depending on the plant they used. Answers may include:

The plant without sunlight – Leaves changed color because plants cannot make their own food without sunlight, therefore the plant did not grow much either.

The plant without water – Plants cannot absorb nutrients from the soil without water.

Therefore, the leaves and the shape of the plant without water also changed because it did not transport nutrients to the leaves.

The plant without soil – It changed shaped as plants needs soil to anchor itself to the ground.

Plants get nutrients and oxygen from soil, so the plant also changed due to the lack of nutrients.

Control plant – grew perfectly! Leaves stayed green and stem grew the longest.

#### Conclusion

1. Was your hypothesis correct? Explain how the results of this experiment either supports of disproves your hypothesis.

O.A.

2. Complete the passage about the basic needs of plant using the vocabulary words.

water	roots	stem	sunlight	soil	leaves	air
To grow pl	ants need	water	,sunl	ight ,	soil	_, and
		air				

The <u>roots</u> absorbs the water and holds the plant in the soil.

The <u>leaves</u> use the sun and air to make food for the plant.

The <u>stem</u> brings water to the rest of the plant.







# **Experiment 2**

# **Preserving Food**

It's breakfast time and you're ready to start the day right with a healthy bowl of cereal, milk, and strawberries. But, when you take out the container of strawberries, you find them covered with a thick fur.

Bacteria are everywhere, in our houses, in the air and even in our refrigerator. They get what they need from our food to reproduce.

So, what will be the best container to keep the strawberries fresh?

First, let's see if you can name the different preservation methods in the pictures below:

# Did you know?

Different containers will have a different preserving impact on your food.





# **Critical Thinking**

Should we also consider containers that are environmentally friendly? O.A.



Drying



Freezing



Salting



Sugaring



**Pickling** 

#### Remember...

Steps in research.

**ASK:** What is your hypothesis? **HYPOTHESIZE:** Identify your

variables.

**TEST:** Conduct an experiment.

**ANALYZE:** Inspect results, draw conclusions, try again!

**COMMUNICATE:** Explain

findings and make recommendations.

# Research

 Investigate containers to keep food fresh for the longest time.



# **Hypothesis**

What is the best container to preserve fresh strawberries in? Read and make a 
on the hypothesis that best matches your idea.

Plastic zipper bags will preserve the strawberries best.

Plastic food containers and the ones with the snap lock lids will preserve strawberries best.













# **Critical Thinking**

Is glass or plastic actually more environmentally friendly? Glass

#### **Materials**

- Two different food containers (such as a plastic zipper bag and plastic food container)
- One food scale
- Three medium strawberries weighing about 20 grams
- Camera to photograph progress (optional)
- Notebook to record observations and create graph
- Data table

# **Data Table Example**

Type of Container	Total Days to Spoil
Plastic zipper bag	(complete this answer on the next page)
Plastic food container	(complete this answer on the next page)

#### **Procedure**

- 1. First, weigh your strawberries, making sure each group weighs the same amount.
- 2. Place four strawberries in the plastic zipper bag and four strawberries in the plastic food container.
- 3. Seal each of the containers.
- 4. If you have a camera take a picture of the original condition of the strawberries. The more proof you have, the better.
- 5. Now it's time to wait. Let your containers sit in the same temperature with the same amount of light, such as on a counter, overnight.
- 6. The next day, photograph your strawberries again and record any observations in your notebook.
- 7. Repeat steps 5 6 until all the strawberries are spoiled. When a strawberry spoils, record the number of days it took to spoil in your data table.
- 8. When all strawberries are spoiled, create a graph comparing the type of container and the number of days it took to spoil to analyze your results.

#### Results

 Circle the picture that looks the closest to the strawberries in your plastic food container. O.A.









How can families eat fresh food without having access to refrigerators?

O.A. for example eating food that they grow themselves.

• Complete the table below with your findings.

Type of Container	Total Days to Spoil
Plastic zipper bags	
Plastic food container	

#### **Analysis**

1. Was your hypothesis correct? Explain your answer?

Yes, because the strawberries kept better in the plastic zipper bag.

No, because the strawberries kept better in the plastic food container.

2. What was the average number of days the strawberries stayed fresh?

#### O.A

3. What is the furry, white stuff you see on the strawberries?

Mold from bacteria.

4. What are the conditions that mold likes to grow in?

A moist area where food is present.

5. Name 3 things you can also do with strawberries to preserve them.

Drying, freezing and preserving with sugar in jam.



# Conclusion

below temperature frequently cool, dry

The skills of preserving food are something our grandmothers know well. Do you think it is worth learning it too? O.A.

Storing your food properly and under the best condition possible will extend the life to its maximum potential. Some foods can be stored at room temperature and some must be refrigerated. Freezing can be used to extend the life of many products. To get the most out of the storage areas, certain conditions must be maintained.

Complete each sentence with words from the word box.

- **Shelf Storage**: Shelf storage should be in a <u>cool, dry</u> area. Many food items should also be kept out of direct light.
- Refrigerator Storage: The refrigerator should be kept at the right <u>temperature</u>.
   Check the temperature <u>frequently</u>.
- Freezer Storage: The freezer should be kept at a temperature \_\_\_\_\_\_0°C. Check the temperature frequently.

# **Experiment 3**

# The Phases of the Moon

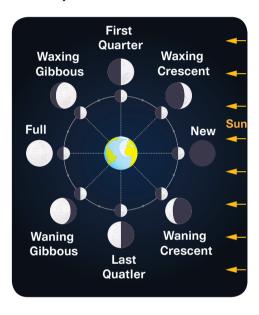
It's amazing to see how the Moon changes over a month. For a couple of days, it is a full bright circle. Then, it begins to shrink, until only a tiny crescent remains. Then, it disappears all together. Then, it appears again, growing a little bigger each night, until it is full again. What's going on?

First of all, the changes in the amount of the Moon's surface that is lit up over the course of a month are called **phases**.

#### Did you know?

The Moon is smaller than the Sun. But they look exactly the same size. Why do you think that is? It's because the Moon is much closer to Earth than the Sun.





#### Research

- Investigate how many Moon phases there are.
- What happens to cause the different phases of the Moon?

The next thing to know is that the light we see coming from the Moon isn't moonlight at all! No, it is actually sunlight! The Sun's light is reflected from the surface of the Moon to us. Because the positions of the Earth, Moon, and Sun are different throughout the course of the month, the amount of the Moon's surface that we can see changes a little bit every night. That's where the Moon's phases come in. When the surface of the side of the Moon facing Earth is completely lit up, we see a Full Moon. When we can't see the Moon at all, the phase is a New Moon. The phases when half the side of the Moon facing Earth is lit up are called the first and third quarters. When the Moon seems to be getting bigger, we say it is waxing, when the part that is lit up seems to be getting smaller, we say the Moon is waning. When less than half of the visible Moon is lit, it's called a crescent, and when it's more than half, it's called a gibbous.

Let's see if we can see how the Moon changes phases!

# **Hypothesis**

How do the positions of the Sun and Moon determine Moon phases? Read a make a  $\checkmark$  on the answer you think is correct.

The position of the Sun and the Moon has an effect on part of the Moon we see at night.

There are different Moons because of the different continents people live. On the other side of the Earth, people see the Moon differently.

#### **Materials**

- Cardboard box, about 20 cm x 25 cm x 29 cm
- 34cm piece of string or varn
- Desk lamp or large flashlight
- Ruler
- Knife
- Tape

Dark room

Pencil

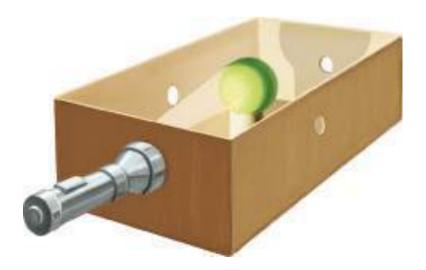
Black

marker

- 7cm Styrofoam ball
- Large paper clip

#### **Procedure**

- 1. In the middle of a shorter side of the box, draw a 5 x 5 cm square.
- 2. Have an adult help you cut out the square.
- 3. Above this opening use the marker to write "Sun/Full Moon." This is where you will always place the light.
- 4. In the middle of the other shorter side of the box, make another square of the same size, but this time, cut only three sides of the square. Leave the bottom of the square uncut, so you can close it like a door. Above this opening, write "New Moon."
- 5. In the middle of the longer side of the box, make another door-hinge square.
- 6. Write "First Quarter" above this opening.
- 7. In the middle of the other longer side of the box, make another door-hinge square and write "Third Quarter" above it.
- 8. Push the paper clip about \(^3\)4 of the way into the Styrofoam ball, tie the string through the paper clip. Tape the top of the box shut.
- 9. Use a pencil to make a tiny hole on top of the box and position the light next to the "Sun" opening.
- 10. Place the Styrofoam ball inside the box and thread its string through the hole in the top of the box.



- 11. Position the lamp or flashlight about 10cm away from the hole marked "Sun."
- 12. Turn on the lamp and darken the room.
- 13. Position your eye near the opening on the other side of the box, holding the string that is attached to the Styrofoam ball.
- 14. Make sure that the adjustable "doors" you made on the long sides of the box are closed.
- 15. Adjust the string until the Styrofoam ball is blocking the light coming from the lamp. Keep the Styrofoam ball in this position by securing with tape.
- 16. Close the door below the "New Moon" label and open the door below the "First Quarter" label. Add this sketch to your data table.
- 17. Close the door below the "First Quarter" label. Peak through the "Sun/Full Moon" opening, being careful not to get too much light in your eyes. What do you notice? Make a sketch in your data table.
- 18. Open the door below the "Third Quarter" label. Look through the opening. Make your last sketch.

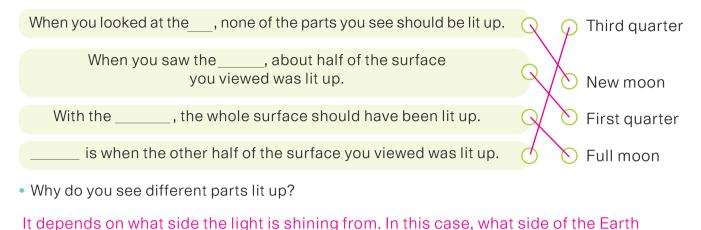
### Results

• Draw a picture of what you saw in each stage of the experiment.

Phase of moon	New Moon	First Quarter	Full Moon	Third Quarter
Amount of surface lit up	The Moon will appear black. A black round circle will be seen.	The Moon will be halfway lit up.	The Moon will be completely lit up. A round, white circle can be seen.	The Moon will be completely lit up. A round, white circle can be seen.

# **Analysis**

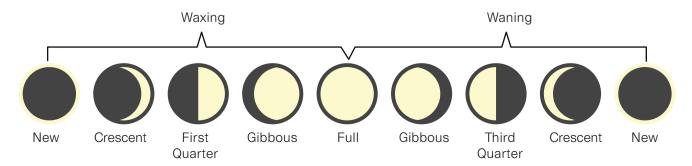
Match the missing word.



# Conclusion

the Sun is shining on.

- 1. Did you learn how the Moon changes shapes? Explain in your own words how this happens.
  - The Sun is shining on the Moon. Depending on where sunlight strikes the surface
  - of the Moon, different phases of the Moon can be observed.
- 2. Fill in the missing words. Moon phases Moon night Sun
  - Moon doesn't have its own light, it gets light from the \_\_\_\_ The
  - We see different parts of the Moon at <u>night</u> because different parts of the
  - Moon are lit up at night.
  - Moon phases This is called



# **Organic and Inorganic Waste**

#### Organic

Organic waste consists of materials which originated from living organisms. There are many different types of organic waste and they can be found in municipal solid waste, industrial solid waste, agricultural waste, and wastewaters. Organic waste is often discarded with other waste in landfills or incinerators, but since it is biodegradable, some organic waste is suitable for composting and land application. Development of biogas is another use of organic waste. Biogas is used as an alternative energy source in some third world countries.



#### Did you know?

Enough food is produced in the world to feed everyone living on Earth.





#### Inorganic

Inorganic waste is waste consisting of materials that are non-biodegradable so that destruction takes a very long time. Inorganic rubbish comes from nonrenewable natural resources such as minerals and petroleum, or from industrial processes. Some of this material was not found in nature such as plastic and aluminum. Some inorganic substances as a whole cannot be explained by nature, while others can only be degraded over a very long time. This kind of waste at the household level, for example can be of glass bottles, plastic bottles, plastic bags, and cans. Inorganic waste cannot be degraded naturally. With creativity, this waste can be recycled for a variety of needs and be reused.

#### Research

 Investigate if waste can be eradicated.

#### **Hypothesis**

Can we prevent any form of waste in the world? Make a

No. There will always be people on Earth, and people will always have some form of waste, either organic or inorganic.

Yes. There will be a solution if everyone stops littering. This will allow our planet to be safe once again.

#### Be a Scientist!

You will be monitoring this over a 7-week period.



#### **Materials**

- 2 clear jars
- At least one "set" of organic and one inorganic trash. The first three are organic examples and the last three are inorganic.
  - 1. apple cores
- 1. a plastic bottle
- 2. piece of potato
- 2. an aluminum can
- 3. 4 tree leaves
- 3. a piece of plastic bag
- Soil, enough to fill two jars (from outside, not store-bought)
- 1 Experiment Data
   Workbook for each
   student, or each student
   needs their science
   notebook

#### **Procedure**

- 1. Place the trash items in a clean, empty clear jar. Try to place the item against the glass, so you can monitor it over time.
- 2. Fill each jar with soil, all the way up until 3 cm from the top.
- 3. Add a few tablespoons of water to the jar, and keep the lid off.

#### Results

1. Record your observations below.

Nothing happened to the inorganic waste, no decomposition happened, the time it takes to break down inorganic waste is much longer.

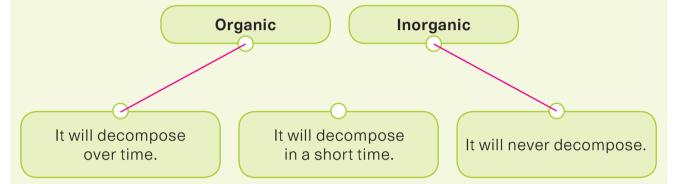
The organic waste started to turn brown, in each of the first few weeks it started to go darker, in week five it seemed that there was no more moisture left in the piece of apple and in the next few weeks it started to shrink smaller and smaller.

2. What did the waste in the jars have in common?

These two forms of waste have nothing in common with each other, there are no changes to the inorganic waste.

#### **Analysis**

1. How do you think these objects will change over time? Match your organic or inorganic waste to the correct finding.



2. Do you think the soil had anything to do with either jars? Explain why.

In the jar with the inorganic waste, there is no or very of little of the soil that has to do with the process.

In the jar with organic waste, the soil plays a big role as it contains all kinds of microorganisms that help with the decomposing process.



Fruits and vegetables can be composted and used as fertilizer.

Can you think of several things that can be composted as organic waste? What would the benefit of this be to your community? O.A.

3. Think about what y true or false quest	you witnessed with the experiment. The tions below.	en answer the following
• Landfill is not harm	ful to the soil.	False
In a lot of countries enough space to liv	there is too much waste and not /e.	True
• It's important to red	cycle to take care of Earth.	True
rec	Think about it Do you and your family cycle? Explain your answer.	
Conclusion	O.A.	
	sis correct? Explain how the results of t ves your hypothesis.  O.A.	his experiment either
reduce our use of i	eriment was to show from a young age norganic items, and the importance of n landfill and the consequences?  O.A.	
	<u> </u>	
Critical Thinkin	g	
	educe, reuse, and recycle? Discuss your	